40 Rocc

POPULAR Computing WEEKLY

35p 19-25 May 1983 Vol 2 No 20

This Week

STAR GAME Star Swarm on Spectrum. See page 10.

News Desk

Psion and Sinclair head into Rom

THE Psion Sinclair partnership is heading into Rom

Cartridge software for the Sinclair Spectrum should be available for the machine some time in late Summer

The Psion/Sinclair cartridges will be priced at about half the current price for Rom software Commented a Sinclair spokeswoman, "Some of the programs will cost less than £10"

In order to run the programs with the Spectrum a special Sinclair adaptor is required but this will cost under £20 When the adaptor is launched, a range of Rom Programs from Psion will also be available

Psion's managing director, David Potter, confirmed that his company had been developing cartridge programs

Continued on page 5

Psion managing director David Potter

Rabbit takes a leap forward

NINE new games for the Vic20 and five new titles for the Commodore 64 have been announced by Rabbit Software

The company, traditionally a specialist in Commodore software, is also diversifying to produce a range of programs for the Spectrum available in June and BBC machines

To support this increased production Rabbit is in the process of setting up its own tape duplication plant using £80 000 worth of equipment supplied by Tape Automation in the US

The Vic titles are *Paratrooper*, with high-resolution graphics on the basic machine, *The Catch*, trapping marbles, *Pakacuda* a sort of underwater Pac-Man *Critter*, farming cherries *Race Fun*, driving cars, *Anti-matter Splatter* protecting the universe *English Invaders*, shooting down nouns, adjectives and verbs for the 7 to 10-year-old *Cyc-*

Continued on page 5

Computer Swap 01-930 3266

Free readers entries to buy or sell a computer
Ring 01-930 3266 and give us the details

TEXAS TI99/4a + leads + some tapes manual two months old still under guarantee £140 Tel Wigan 713624

UK 101 8K with CEI monitor and extended monitor tape for £80 Tel (Shaw) 0706 844888

SHARP PC 1500 + 8K Ram + 4 colour printer-plotter £275 Tel 480 5637

VIC20 C2N cassette unit 8K store board six cartridges £70 software books mags joysticks £260 Tel 01 584 5800

SWAP Voodoo Castle for the Count Tel 01-805 6641 (6 pm)

WANTED Oric 16K Tel 01 888 7222

NEWBRAIN AD beginners guide and tape technical notes all immaculate offers around £230 Tel Worthing 207201 any time

OVER 20 SPECTRUM GAMES FOR SALE, including Hobbit Penetrator Flight Simulation Black Crystal Schizoids etc Tel 061 881 4551 (Tony)

WANTED VIC20 SUPER EXPANDER, programmer's aid cartridge Stack super-charger or Audiogenic Bull cartridge Tel 061-308 8835 after 6 pm

Continued on page 44

★★ADVENTURE COMPETITION—WIN A 64★★



19-25 May 1983 Vol 2 No 20



The Team

Editor
Brandon Gore

News Editor
David Kelly [01-930 3271]

Software Editor
Graham Taylor [01-839 2504]

Production Editor
Lynne Constable

Editorial Secretary
Caroline Owen

Advertisement Manager
David Lake [01-839 2846]

Advertisement Executive
Alastair Macintosh [01 930 3260]

Classified Executive
Diane Davis [01-839 2476]

Administration
Therese Lacy [01 930 3266]

Managing Editor
Duncan Scot

Publishing Director
Jenny Ireland

Popular Computing Weekly,
Hobhouse Court 19 Whitcomb Street,
London WC2 7HF
Telephone 01-839 6835
Published by Sunshine Publications Ltd
Typesetting origination and printing by
Chesham Press Chesham Bucks
Distributed by S M Distribution
London SW9 01-274 8611 Telex 261643

Subscriptions
You can have *Popular Computing Weekly* sent to your home

UK Addresses
26 issues £9 98
52 issues £19 95

Overseas Addresses
26 issues £18 70
52 issues £37 40

How to submit articles
Articles which are submitted for publication should not be more than 3 000 words long The articles and any accompanying programs, should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted

All submissions should be typed and a double space should be left between each line Please leave wide margins

Programs should, whenever possible, be computer printed

We cannot guarantee to return every submitted article or program so please keep a copy If you want to have your program returned you must include a stamped addressed envelope

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work.

This Week

Editorial

British Telecom is to computerise its directory enquiries service The contract, worth £25m has been awarded to Standard Telephones and Cables, despite strong competition from ICL, IBM and DEC

This development may not seem immediately relevant to micro users, but it is indicative of the way that computers are forcing themselves into every aspect of public and private life A year ago, computers were scarcely mentioned outside the specialist press — now there are radio and TV micro shows and regular computer columns in *The Times* and *The Standard*

Cars are now advertised on the strength of their microprocessor controls Football and election results are forecast with the aid of computers Even books are now being written on computers with the help of word-processing packages and disc systems

In short there is a far greater public awareness of computers than ever before Micros are 'hot' in every sense of the word

But, despite this computer awareness industry is taking a long time to adapt to changed circumstances British Telecom's directory enquiries service will not be completely computerised until 1986

Computer awareness is one thing, computer acceptance is another

Next Thursday

Find out if you can bomb the enemy submarines as your warship patrols the ocean You have 20 depth charges and the deeper the enemy submarine, the more points you score if you hit it! Depth Charge — next week s Star Game for the Vic20 by Robert Irvine

Heading into Rom

Continued from page 1

for some time "We have so far organised six items but by the time the interface is launched we will have others ready," he said

Sinclair's managing director Nigel Searle commented, "Obviously everyone is working on solid-state software — we wouldn't went to stick only with cassette material indefinitely"

It is possible that the Sinclair move has been prompted by an increase in software piracy and home-taping David Potter estimates that piracy could be costing his company as much as £2 9m — 30 percent of its turnover — each year

Rabbit leaps forward

Continued from page 1

lons avoiding alien fighters and *Escape MCP*, fleeing the 6502's CPU

The games for the 64 are *Pakacuda*, *Cyclons*, *Centropods* — a sort of Centipede game — *Escape MCP* and *Annihilator* Rabbit has also produced the first of a range of business programs for the 64 — *Infomast*, a programmable database

All the programs with the exception of *Infomast* are priced at £5 99 *Infomast* costs £91

The games are available through Lasky's Curry's Micro C and Commodore dealers Also, in the next few weeks, the games for the Commodore 64 will be sold through W H Smiths

Rabbit director, Heather Lemont commented, "We feel we now have a good grasp of the Vic and 64 so we want to cover a wider range of machines

"The Spectrum has now come down to a price where it is available to almost everybody and so it seemed a natural first choice

Rabbit Software was formed in 1981 and began by selling games for the Apple and Pet machines The company now has 12 full-time employees and its games for the Commodore machines are distributed throughout the world

Kempston goes soft with new company

KEMPSTON Microelectronics is moving into software

The company which sells a range of add-ons for the Sinclair machines, follows other companies such as DK 'Tronics and Quicksilva who have also diversified in a similar way

The software operation will be run as a seperate company — Kempsoft — and will both distribute existing programs from smaller houses and generate its own software To begin with all material will be for the Spectrum

Kempsoft's first task will be to distribute the new game from Ultimate Play the Game called *Jet Pac* The first offerings under its own banner will be *Android 1* and *Conversion Tapes 1 and 2* These latter two titles will convert big-selling games from other suppliers so that they can be operated using the Kempston Competition Pro Joystick

The first conversion tape will allow joystick operation of Imagine's *Arcadia*, Psion's *Flight Simulation* and (with Melbourne House) *Horace Goes Skiing*, Melbourne's *Penetrator* Bug Byte's *Spectres* and Mikrogen's *Space Zombies* *Conversion Tape 2* will work with a further seven titles including DK 'Tronics *Centipede*

To complement Kempston's Centronics interface for the Spectrum, Kempsoft will produce a word-processing package and a number of business programs

"Software will become an increasingly important part of what we do," said Kempston's managing director Ab Pandaal "We will be shortly appointing a manager for Kempston Microelectronics, leaving me free to concentrate on Kempsoft

"A full-time programmer will be taken on and I am currently on the look-out for games that we can sell through our existing dealer network"

As part of Kempston's expansion, both companies will be moving to new premises in the next four weeks

More cash for school micros

COMPUTERS in education get another boost as the Department of Industry's Micros in Schools programme gets a further £8m

Some £3m of this is to go to secondary schools to provide additional colour monitors and simple control devices such as the Economatics BBC Buggy three-wheeled robot

The remaining £5m will go to colleges of further education to supply computer-controlled machine tools

Timex sit-in continues

WORKERS involved in the sit-in at the Timex plant in Dundee have rejected a 10-point plan proposed by the company to solve the dispute

The sit in by 350 workers, now in its seventh week was prompted by proposed compulsory redundancies at the plant (see *PCW* April 14) The industrial action has halted work on the pilot production line for the Sinclair flat-screen tv

Under the rejected company plan Timex had agreed to make no compulsory redundancies for a period of 90 days however, union representatives are seeking agreement on a procedure for reallocation of employees after the 90-day period

In an official statement, Sinclair Research commented that the rejection of the company's plan was "very serious" Timex is now expected to continue with its legal move to evict the workers from the Milton plant

● Sinclair Research is concerned that the production of its £50 flat screen tv shouldn't be delayed because of international competition from similar products manufactured in Japan and the Far East Sony, Casio, Seiko and Hitachi all have miniature tv products at an advanced state of development

Texas follows suit with TI 99/4A package deal

TEXAS Instruments has now joined the growing band of price cutters reacting to the Sinclair Spectrum price drop three weeks ago

Every purchaser of the TI 99/4A microcomputer between now and the beginning of July will receive a pair of joysticks, the *Beginner's Basic Tutor* cassette, the *Connect Four* Rom cartridge and either the TI *Speech Synthesiser* or the TI cassette recorder, entirely free

This package deal is similar to the combination announced by Commodore two weeks ago for the Vic20

The offer adds equipment with a recommended retail price of £105 to the TI 99/4A machine which sells for around £150

● Timex has cut the US cost of the ZX81 American equivalent, the TS1000 — it is now down to £33 50

The Sky at Night . . .

I am writing to you to make a few comments about an article which you published in yous 21-27 April issue, regarding the tracking of our amateur radio satellite, UOSAT

First, concerning factual problems in the text, please note the following

1) The title "The Sky at Night" and references to astronomers are irrelevant — UOSAT carries no astronomical experiments and passes overhead (anywhere on earth) during the afternoon as well as overnight
2) The frequency given of 145 8 MHz is incorrect — the actual VHF beacon frequency is 145 825 MHz
3) It is unlikely that a general-purpose portable aircraft/marine band receiver will be suitable for UOSAT reception — the satellite will require a narrow-bandwidth frequency-modulation (nbfm) communications receiver for adequate reception. Indeed unless one of these is used in conjunction with a directional antenna, this program is unnecessary!
4) Synthesised voice downlink data is only one of many data formats transmitted — others of interest to your readers may be 1200 bd, 600 bd, 300 bd and 110 bd ASCII, 45 5 bd RTTY and 10 and 20 wpm morse code
5) Elevation is the *angle* above the horizon
6) Guildford 571281 is the main University of Surrey telephone number The UOSAT office/command station houses an extremely busy team of engineers who have been inundated, since the publication of your article with requests for orbital data which can more conveniently be supplied by the recorded message which we have provided on Guildford 61202

Secondly the program and text data themselves have a number of flaws

1) "Azimuth" and "Elevation" in the first line are both spelt incorrectly
2) The orbital parameters used in the program appear to be based on expected data supplied *before* the satellite was launched in October 1981! Since atmospheric drag causes these parameters to change we supply weekly updates on Guildford 61202 so the program data supplied is most unsatisfactory This is the main reason for the 'Accumulative error now significant' exit at line 1420

   Since Guildford 61202 only gives one set of equator crossing longitudes and times for each day the program as published appears only to be capable of producing beam headings for two of the 15 orbits daily, before this line causes it to fail! Allowance for drag would allow the program to run (accurately) for a whole week's worth of predictions
3) The equator crossing time and bearing supplied in the test data are totally fictitious and can not occur in practice Due to the sun-synchronous properties of the UOSAT orbit a bearing of 320° will be seen at approximately 12 30 GMT
4) I have not been able to run the program to test for numerical inaccuracies or incorrect formulae — both common in programs of this type — due to the recent demise of our ground-station Spectrum

Your readers may be interested to know that AMSAT-UK can supply sets of programs, orbital data and technical information to help track and observe the whole AMSAT-OSCAR series of satellites, as well as a number of weather satellites They can obtain a list of publications by sending a stamped addressed envelope (AMSAT UK is a volunteer-run organisation subject to the same large surges of requests as ourselves) to

AMSAT UK
94 Herongate Road
Wanstead Park
London E12 5EQ

I hope that this information is of use

R M A Peel, G8NEF
Spacecraft Engineer (Software)
Dept of Electronic and Electrical Engineering
University of Surrey

Our thanks to Mr Peel for his corrections and additions to "The Sky at Night" article and our apologies to the UOSAT team for any inconvenience caused by printing the main University of Surrey telephone number

We would be extremely interested to hear from any of our readers who have succeeded in receiving data from UOSAT OSCAR-9

Computing classes

With reference to the enquiry in *Popular Computing Weekly* volume 2, Number 11, concerning computing classes, I have been running classes since last November in North Berwick using the BBC Model B micro

These classes have covered the range of activities from computer appreciation to programming in BBC Basic. The age range has been from 8 to over 70 years old and one course included a grandmother who was determined to be a step ahead of her grandchildren The normal course length is 10 to 20 hours

Ian Goodall
14 Ware Road
North Berwick
East Lothian EH39 4BN

Software protection

With regard to your editorial in the edition of 28 April, may I make the following points on behalf of the Computer Trade Association

We realised from the start that the specific needs of the software companies in relation to the question of software protection could not effectively be met by the association whose general aims are the "advancement and promotion of the Computer Trade" It has also been recognised that there is a danger at having too many bodies trying to do the same thing

It was clear at our last meeting that what was needed was a single body to act for and on behalf of the software houses to deal with the specific subject of software protection With this in mind the association is actively supporting steps for the setting up of such a body which will be an affiliated group to the association Such a group will concentrate on the specific tasks which need to be carried out in relation to the question of software protection Plans for such a group are now well developed and it will certainly be in existence within the next couple of weeks It will have its own staff and be working in close liaison with other bodies dealing with similar problems particularly in the video industry

The formation of such a group reflects a positive move by the association and its members to tackle the difficult problem of software protection It also means that the association as a whole can spend a greater part of its effort carrying out its main aims, that is, the general improvement of the computer trade and the service it provides to the public

May I also ask you to make it known to your readers that the association does run a complaints service and should they have any complaints about service, supply, etc, they should write to me and the matter will be looked into The association is quite prepared to take up complaints from the public against both members and non-members

Incidentally it may interest you to know that there are plans for the future to set up affiliated groups for both dealers and manufacturers

Nigel Backhurst
General Secretary CTA
108 Margaret Street
Coalville
Leicestershire LE6 2LX

Programs needed!

Help Programmers everywhere, I need educational programs!

I have just purchased a 48K Spectrum for use in a hostel for mentally handicapped adults, but I am unable to find any suitable teaching programs to use with them If you feel that you can help, I require programs in the fields of maths spelling, recognising colours, improving co-ordination, etc

Because of the group that the programs are intended for, they need to be fun to use and should make full use of colour, sound and graphics

P Barrow
Piper House
2B St Marks Road
London W11

Star Swarm

A new game for the 16K Spectrum by Richard Sharod

The object of this game, for the 16K Spectrum is to shoot down the aliens which appear in formation at the top of the screen. Each alien will fall out of formation and try to pass you. Points are awarded for the destruction of each alien, but points are also deducted from your score for each alien that passes you.

If you crash into an alien, you will lose one of your three lives.

When you clear a formation, another will appear at the top of the screen. When you have cleared six formations you will be moved to a star-base where you will have to shoot a mother ship. Sharp shooting is needed here to gain a high bonus.

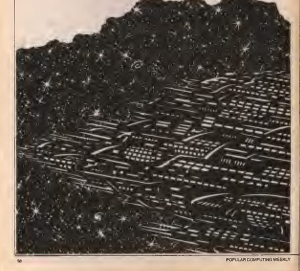
Controls are: 5 — left, 7 — right, 0 — fire.

Program notes

The program includes two machine code routines which are used to create sound effects. The codes for these routines are held in the first two data statements.

The program uses all 21 user defined graphics. It is advisable to enter and run lines 10-31 before the rest of the program, so that you can see them.

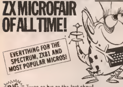
NB. Great care should be taken to ensure that the data is entered correctly.

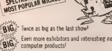


```
1 REM
        "STAR-SWARM"
written by Richard Sharod
2 RESTORE : CLEAR 32399
3 LET n$="SPECTRUM": LET v=1700: FOR a=32400 TO 32466
4 READ n: POKE a,n
5 NEXT a
6 DATA 0,1,197,33,10,0,17,40,0,229,205,181,3,225,17,16,0,167,237,82,125,254,200,56,237,193,16,16,238,201,0
7 DATA 0,1,197,33,0,3,17,1,0,229,205,181,3,225,17,16,0,167,237,82,32,240,193,16,233,201,0,0,0,0
10 FOR x=144 TO 164: FOR i=0 TO 7: READ a: POKE USR CHR$ (x)+i,a: NEXT i: NEXT x
11 DATA 25,67,76,240,76,70,3,0
12 DATA 2,130,226,62,90,194,128,0
13 DATA 26,224,224,56,64,54,224,0
14 DATA 0,7,7,0,0,0,7,0
15 DATA 146,84,0,214,0,84,146,0
16 DATA 170,170,255,248,14,3,1,1
17 DATA 85,85,255,31,112,192,128,128
18 DATA 48,186,219,189,186,56,16,16
19 DATA 18,180,235,207,180,20,0,0
20 DATA 3,30,241,181,16,16,30,24
21 DATA 192,126,143,150,112,80,0,132,2
22 DATA 120,71,50,220,20,71,131,1
23 DATA 1,226,50,135,20,228,195,128
24 DATA 0,4,187,247,127,72,20,10
25 DATA 16,32,204,129,254,48,58,72
26 DATA 240,137,15,80,30,17,8,4
27 DATA 31,145,240,20,120,136,16,32
28 DATA 100,87,30,20,10,96,20,20
29 DATA 100,20,180,20,10,8,20,34
30 DATA 201,167,100,140,150,180,250,183
31 DATA 147,201,181,49,20,40,71,131
50 GO SUB 3000
70 LET sc=0: DIM a$(10): LET b$="[illegible]"
71 LET hit=0
73 LET li=3
75 BRIGHT 1: INK 5: PAPER 0: BORDER 0: CLS : LET j=1
80 IF j>10 THEN GO TO 1000
81 PRINT INK 6;AT 0,20;"SCORE=";sc
82 PRINT AT 0,0;: FOR q=1 TO li-1: PRINT "  ";: NEXT q
83 LET a=15
85 LET b$=a$(j)+a$(j+1)
87 PLOT 0,16: DRAW 10,-16: DRAW 230,0
88 DRAW 10,10: DRAW 0,-16: DRAW -240,0: DRAW 0,10
89 PRINT AT 2,10;: FOR i=0 TO hit: PRINT
90 FOR z=0 TO 20 STEP 1: PRINT AT z,10;"  ": RANDOMIZE USR 32430: PRINT AT z,10;"  ": NEXT z
91 PRINT INK i/2;BRIGHT 1;AT 2,10;b$;"  ";b$;"  ";b$;"  ";b$;"  ";b$
95 PRINT AT 2,10;: FOR i=0 TO hit: PRINT '';: NEXT i
96 LET x1=10: LET y1=10
100 LET x=2: RANDOMIZE : LET d=INT (RND*10): LET i=INT (RND*10): LET y=i+d
110 PRINT AT 20,a-1;"  "
120 PRINT AT x1,y1;"  "
140 LET a=a+(INKEY$="7" AND a<27)-(INKEY$="5" AND a>2)
160 IF INKEY$="8" THEN GO SUB 250
170 LET x=x+1: LET y=y+(RND<.4 AND y<28)-(RND>.6 AND y>1)
175 IF x=20 THEN LET sc=sc-10*i: PRINT AT 0,20;"     ";AT 0,20;sc: PRINT AT x,y;"  ": GO TO 300
180 PRINT INK i/2;AT x,y;b$
185 IF x=19 AND y=a THEN GO TO 800
186 IF x=19 AND y=a-1 THEN GO TO 800
187 IF x=19 AND y=a+1 THEN GO TO 800
190 LET x1=x: LET y1=y
195 BEEP .01,(x/2*i/2)-20
200 GO TO 110
250 LET t=a: FOR g=19 TO x1 STEP -2: PRINT AT g,t;"I I";AT g,t;"  ": NEXT g: PRINT AT g,t;"  ": RANDOMIZE USR 32400: PRINT AT g,t;"  "
260 IF t=y OR t=y+1 OR t+2=y+1 OR t+1=y THEN GO TO 500
270 RETURN
300 LET hit=hit+1
310 IF hit>=8 THEN LET hit=0: LET j=j+2: PRINT AT 20,a-1;"  ";AT x,y;"  ": GO TO 80
340 GO TO 95
500 FOR h=1 TO 3: PRINT AT x,y;"  ": RANDOMIZE USR 32430: PRINT AT x,y;"  ": NEXT h
510 LET sc=sc+10*i
515 PRINT AT 0,20;"     ";AT 0,20;sc
516 LET hit=hit+1
520 GO TO 310
800 PRINT AT 20,a-1; FLASH 1; INK 6; PAPER 2;"[illegible]";AT 19,a-1;"[illegible]": FOR i=1 TO 10: RANDOMIZE USR 32430: NEXT i
810 LET li=li-1
820 IF li<>0 THEN GO TO 70
830 IF sc<v THEN GO TO 850
840 LET v=sc: PRINT AT 10,1;"YOU HAVE REACHED THE HI-SCORE"
845 PRINT AT 15,5;"PLEASE ENTER YOUR NAME": INPUT "NAME>";n$
850 CLS : PRINT AT 10,10;"HI-SCORE=";v;AT 12,12;"BY ";n$
860 FOR f=-50 TO 50 STEP 1: BEEP .1,f: NEXT f
870 GO TO 50
1000 CLS
1001 LET k=1000
1010 PLOT 24,24: DRAW 0,100
1011 PLOT 232,24: DRAW 0,100
1012 PLOT 40,30: DRAW 0,64
1013 PLOT 216,30: DRAW 0,64
1014 PLOT 56,40: DRAW 0,60
1015 PLOT 200,40: DRAW 0,50
1016 PLOT 72,40: DRAW 0,60
1017 PLOT 184,50: DRAW 0,50
1020 PLOT 0,0: DRAW 20,0: DRAW 0,-5: DRAW 50,0: DRAW 0,0: DRAW 0,0
1030 PLOT 20,24: DRAW 40,24
1040 PLOT 232,24: DRAW -40,24
1050 PLOT 24,124: DRAW 40,-24
1060 PLOT 232,124: DRAW -40,-24
1070 PRINT AT 0,5;"[illegible]";sc;AT 0,17;"[illegible]";k
1080 FOR i=2 TO 20: PRINT AT i,10;"  ": RANDOMIZE USR 32400: PRINT AT i,10;"  ": NEXT i
1090 LET a=10: LET c=+1: LET x=0: LET y=0
1200 PRINT AT x,y-1;"   ";AT x+1,y-1;"   "
1205 LET k=k-5: PRINT AT 0,23;k;" "
1210 PRINT AT 20,a-1;"   "
1220 LET a=a+(INKEY$="7" AND a<18)-(INKEY$="5" AND a>18)
1230 BEEP .01,y*2
1240 IF INKEY$="8" THEN GO SUB 2000
1250 LET y=y+c
1260 IF y>28 THEN LET c=-1
1270 IF y<3 THEN LET c=+1
1280 GO TO 1200
2000 RANDOMIZE USR 32430: IF a<>y THEN RETURN
2010 FOR i=19 TO 3 STEP -1: PRINT AT i,a;"I I": BEEP .1,i*2: PRINT AT i,a;"  ": NEXT i
2020 FOR i=1 TO 10: PRINT AT x,y;"  ";AT x+1,y;"  ": RANDOMIZE USR 32430: PRINT AT x,y;"  ";AT x+1,y;"  ": NEXT i
2030 LET sc=sc+k: PRINT AT 0,11;sc
2031 IF v<sc THEN LET v=sc
2035 PRINT AT x,y;"  ";AT x+1,y;"  "
2040 FOR f=20 TO 2 STEP -1
2050 PRINT AT f,a;"  ": BEEP .1,f: PRINT AT f,a;"  ": NEXT f
2060 CLS : PRINT AT 10,8;"[illegible]";AT 15,5;"[illegible]"
2070 LET li=li+1
2080 BEEP .2,RND*40
2090 IF INKEY$="" THEN GO TO 2080
2100 GO TO 70
3000 INK 5: PAPER 0: BORDER 0: CLS : PRINT INK 5; PAPER 1;AT 0,8;"[illegible]"
3010 PRINT '"SCORE  10  30  50  70  90  110"
3020 PRINT '"SHIP   "
3030 PRINT '"  Hitting the above ships will gain you the above points."
3040 PRINT '"  However letting them past will lose you points."
3050 PRINT '"  You have to kill off as many aliens as you can before you reach the star-base."
3055 PRINT INK 5; PAPER 1; FLASH 1;AT 21,0;"[illegible]"
3060 BEEP .02,RND*40
3100 IF INKEY$="" THEN GO TO 3055
3110 CLS
3120 PRINT "  When you reach the star-base you will have to shoot a mother ship."
3130 PRINT "  Mothership": PRINT "  "
3140 PRINT '"  Bonus point are available, so sharp shooting is needed to gain high points."
3150 PRINT '"  You get an extra ship after hitting the mothership."
3160 PRINT '"  5 Left  7 Right  8 Fire"
3170 PRINT INK 5; PAPER 1; FLASH 1;AT 21,0;"[illegible]"
3180 BEEP .1,RND*40
3190 IF INKEY$="" THEN GO TO 3180
3200 RETURN
```

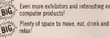
ZX MICROFAIR

THERE'S ROOM FOR EVERYONE AT THE BIGGEST ZX MICROFAIR OF ALL TIME!

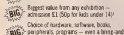




- **BIG** Twice as big as the last show!
- **BIG** Even more exhibitors and interesting new computer products!
- **BIG** Plenty of space to move, eat, drink and relax!
- **BIG** Biggest value from any exhibition — admission £1 (50p for kids under 14)!



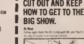
- **BIG** Choice of hardware, software, books, peripherals, programs — even a bring-and-buy sale!
- **BIG** Exhibition hall in parkland — big space — big car park!



- **BIG** Big choice of "how to get there" — rail, road, bus, tube, foot — see right!
- **BIG** Big day out for all the family!
- **BIG** Big savings on most manufacturers' "show offers"

CUT OUT AND KEEP HOW TO GET TO THE BIG SHOW.

By Road
Follow signs from the A1 (links with M1 and North Circular). Plenty of parking space available. Variety of routes from Central London.



By British Rail
From London, Kings Cross or Moorgate — about every 10 minutes to Alexandra Palace station — free shuttle bus or short walk from there!
From any part of the U.K. enquire from Kings Cross Travel Centre London N1 9AP, phone 01 278 2477, about special day trips to the ZX MICROFAIR!

- ALEXANDRA PALACE — Free shuttle service to Exhibition
- KINGS CROSS
- MOORGATE

By London Transport
Underground: Victoria Line from Victoria (also Oxford Circus, Kings Cross, St Pancras) to Highbury and Islington — change cross platform to BR Suburban Service to Alexandra Palace — free shuttle bus or 5 minute walk from there!

- BRITISH RAIL ALEXANDRA PALACE
- HIGHBURY ISLINGTON (change for B.R. Suburban service)
- KINGS CROSS
- VICTORIA

Alternative: Piccadilly Line from Heathrow etc. to Finsbury Park or Wood Green — Link with W3 bus service to the fair.

- WOOD GREEN (Link with W3 Bus to exhibition)
- FINSBURY PARK
- KINGS CROSS
- OXFORD CIRCUS
- HEATHROW ← Piccadilly Line

Come to the big one...

7th ZX MICROFAIR
ALEXANDRA PALACE, SATURDAY, JUNE 4th 1983

SATURDAY JUNE 4th at ALEXANDRA PAVILION, ALEXANDRA PALACE, WOOD GREEN, LONDON N22. FROM 10am to 6pm.
Advance tickets available from: Mike Johnston, 71 Park Lane, Tottenham, London N17 0HG. Adults £1.00. Kids (under 14) 50p.
Please make cheques payable to ZX MICROFAIR and enclose S.A.E.

Galloping llamas!

***David Kelly** talks to a man who is hooked on llamas – Jeff Minter*

Llamasoft is an unusual animal. It is now one of the top independent Commodore Vic20 and 64 software houses, but it is still basically a one-man company.

Jeff Minter began programming the Vic20 when he was forced to spend an unhappy few months lying on his back recovering from a nasty virus infection. After this enforced break in his college course in maths and computing — which he didn't care for very much anyway — he decided not to return, but to push on with the galloping Llamasoft venture.

As to the reasoning behind his company's choice of name he says, "I like Llamas" to which there are few answers. And to prove the point he sports a knitted pullover with repeated motif looking uncommonly like the mountain loving ruminant.

Jeff, who recently celebrated his 21st birthday, formed the company just over a year ago to sell his games. However his interest in micro-computers goes back further. At sixth form college he started by studying double-maths A-levels which he hated. "So they put me on an English course — and I used to write code during the lessons," says Jeff. "I was only allowed to borrow the 6502 book from the library for a week so I had to learn it quick!

"I did some programming on the 8K Pet. That was in the days when an Apple with high resolution screen was heaven and having more than 8K was a dream."

While at college Jeff programmed a graphics Rom for DK'Tronics and then started thinking about Vic20 programming. "It was cheap and it had colour. It's very strange — one of the last things I remember on the day I fell ill was stumbling into a shop in Oxford asking if they had a Vic."

Brain-damaged

In April last year Llamasoft was getting orders worth £15 to £20 a week. "Now we are banking about £5 000 a week which, for a one-man operation, is really nuts." Jeff shakes his head slightly bemused.

Jeff is first and foremost a programmer. And like so many programmers he is a science fiction fanatic — his book shelves are crammed with garish covers from Asimov to Herbert.

The arcades also attract him. He spends a good deal of time there and actually has his own arcade machine of *Space Firebird* – a version of *Phoenix* — in his work room. Jeff reckons you have to be an arcade junkie to write good computer games. "Eugene Jarvis who wrote *Defender* for Williams said once that to come up with good games ideas you have to be a bit brain-damaged — and he has a point.

"The first game I produced was a version of *Defender* and I solemnly swear not to copy an arcade game again. I am now totally against the idea of arcade copies — you can do just as well without imitating other people's ideas. I can't really see what is the fun in sitting down and coding something that has already been done.

"Most of the software houses today only seem to be interested in putting everything in a special box. I went up to one recently who spend £40 000 a month on advertising. They said 'This game will be the top seller in two months time'. To say that before the game has even been written is incredible."

At the Pet show last June — Llamasoft's first public appearance — Jeff's version of *Defender* was seen by Jay Balakrishnan, founder of HES, one of the big US software houses, and he took up the American rights to the program calling it *Aggressor*. Since then HES has taken *Grid Runner* from Jeff which has become a number-one best seller. Sixty per cent of Jeff's income now comes from the US, just from these two games.

At the beginning of April Jeff concluded a deal with HES to write games for them. "Originally they wanted me to write 10 games a year — we settled on four. That is much more realistic — I can then afford to sit down and tweak at each program until it is just right before I hand it over.

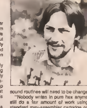
"The 64 is going to be massive in the US. It is rumoured that the price may drop to under $200 and all the big Atari companies like Broderbund are converting their material for it.

"I first saw the machine at last year's Pet show in June. Then HES brought an American machine over for me in September. It is a great machine — just about anything you can do on the Atari you can do on the 64. Although it has fewer colours it has more sprites — more moveable graphic characters. And sprites are *the* way to go.

"Most arcade machines — *Phoenix* for example — are just machines that can handle 64 multi-coloured sprites. The 64 has 8 sprites but you can improve on that. By interrupting the screen scan you can, theoretically, have 256 but I find that 64 is more convenient. Otherwise all the interrupts slow down the processor."

When coding a program Jeff uses a modular approach. "I may get the ships moving one day, something else the next but it is vitally important to be bug each module every time I come to the machine. Then at the end I tie all the sections together with a start loop. I keep notes as I go along sticking little *Remark* fields as I go. Nothing is so incomprehensible as your own code a month later.

"My next big game will be called *Matrix*. When I have got it right for the Vic it will only take a few days to convert it to the 64 because only the screen access and



sound routines will need to be changed.

"Nobody writes in pure hex anymore. I still do a fair amount of work using the standard mini-assembler cartridge on the Vic. Although you cannot define labels on it, it is useful for de-bugging or for writing little routines that are machine-specific.

"Most of the time though I use the Commodore 64 assembler — a standard Pet assembler converted for the 64."

Doodling along

Jeff has a great deal of admiration for other programmers and believes that in the future it is the writers not the publishers who will attract attention. "In America it is already going that way — companies are starting to push names. HES is now pushing me and Tom Griner who did *Choplifter* for the Vic. He is only 17 and is very strong on coding and does a lot of very good conversions.

"*Star Raiders* on the Atari is the best game I've ever seen. To get that inside an 8K Cartridge is a great programming achievement. I think it is a capital crime that nobody knows who wrote it because Atari keep their programmers quiet. Whoever wrote it deserves to be very rich and have his feet kissed every morning. That game is evil!"

Jeff is really a software house manager by default. His interest is programming but the idea of working for someone else does not appeal. Also, the idea of expanding and becoming an employer of other games writers doesn't seem right to Jeff. "I just want to carry on doing my own thing. When graphics get really complicated I might need a specialist — a cartoonist. Or I can see myself joining a programming team — but really I'm just doodling along getting the next game out."

Matrix will be ready in time for the Chicago show in June. "It's nearly working now — there is only one small bug to sort out. Occasionally when you shoot a camel its bum gets left behind!"

Jeff plans to convert *Laser Zone* to the 64 and produce a sequel to *The Attack on the Mutant Camels* called *The Camel's Revenge*.

Meanwhile Jeff is hooked on *Matrix*. "By the time I demonstrate it in the States I want to be very good — I don't want anyone beating me out there!" ■

Staying cool . . .

***Mike Grace** picks his way through another selection of Vic20 arcade games*

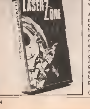
I bought my Vic20 just after the very first machines had become available. Initially I was frustrated by a lack of software and, apart from those appalling 'games' in the back of the User Guide and a couple that appeared in early magazines, I was left stranded for several weeks before the first of Commodore's range of cartridges became available. I can well remember the day I saw the first software — after parting with what seemed like a fortune (£19.95 to be exact) I hurried eagerly home with my own version of *Space Invaders*.

Regular readers will know I have a distinct dislike for the wham bam shoot 'em up style of game, preferring the more gentlemanly and skilful art of the adventure game or the game of chance. But in those halcyon days of 1982 *Space Invaders* was all I had and I sat entranced, finger on the firing button, as wave after wave of ... well, you know the game and if you're reading this you probably know the fascination.

So in tribute to those early days, I thought I'd devote this review to the shoot 'em up type of game (or shoot 'em down in some cases). If you are already about to flick to the next page with a grimace of disgust or a tired yawn — stick with it, you may be in for a few surprises!

Let's start with *Abductor* by Llamasoft (who have one Jeff Minter — a programmer extraordinaire who is obviously going places). This cassette is priced at £6 and is for the unexpanded Vic, a fact hidden away on the instruction sheet. It would have been better to have the memory required displayed more prominently on the cassette itself or on the packaging.

On *Loading* I was faced with a very low resolution graphics drawing of an



animal (presumably a llama) and the slightly twee remark that it was *lloading* (not a spelling error but a link to the double l in llama). But enough of the frivolity — on with the game.

Basically, you are in control of a plasma cannon which patrols along the bottom of the screen, guarding a few matchstick men you must protect. The baddies are a fleet of objects that fly about and try to pick up your men and take them off, whereupon you lose. Your aim is to blast the baddies out of the sky, either before they reach your crew or at least before they get your man to the top of the screen. If you manage to get them before they actually get the men away he will fall safely to the ground and remain as bait for another fleet of baddies. Needless to say, each succeeding wave of the enemy gets harder to stop.

The game is fairly straightforward to play and I liked the fact that with relatively little trouble you can exchange your insignificant cannon for a much more impressive (and double firing) one. I found the flight patterns of the aliens very stereotyped (but they still beat me as often as not) and their ability to appear as if from underground a little sneaky. But one aspect of the game I felt was cheating, was the fact that it was impossible to rescue the poor little man at the extreme edge of the screen, either left or right.

"Blast as fast as you can!"

The instructions were good, the cover reasonable and I liked the tips given which include the classic remark *Stay cool* as well as more mundane advice such as *Blast as fast as you can* and *Be accurate*. What did depress me was the comment that awesome players will be looking for a score of 15,000 or more — my own score was pitiful!

The next game I *Loaded* was *Power Blaster* from Romik, also for the unexpanded Vic, at £9.99. It seems only a couple of months ago I was bemoaning the fact there was so little software for the 16K expanded Vic — now it seems almost the reverse. Anyway, *Power Blaster* is an excellent example of lack of kilobytes not reducing originality, and is one of the best games I've played yet from Romik. *Loading* reveals the now traditional blue background and letters in Romik style, and after about six pages of totally unnecessary background spiel we get down to the game.

A maze-like structure is filled with dots (bombs planted by the baddies) and gal-

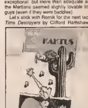


loping Martians. You are in control of a spaceship which is free to move around the maze, wiping out the bombs by firing blasts at them, and killing Martians before they get close enough to touch you.

Like all these games, it's much easier to play than to explain. Unlike quite a few it's also more interesting to play, partly because the score for bombs actually decreases if you aren't firing and destroying more (so you can end up with a minus score if you aren't careful) — and you only have one life. Let a Martian get you and zappo! You're dead.

I liked the originality of this one, and the noise made by firing the gun seemed more satisfying than usual. One unique feature was the ability to enter hyperspace to escape the Martians. Pressing the fire button at the same time as moving the joystick forward makes your ship disappear and reappear somewhere else at random. Unfortunately, in the excitement of the game, I found myself doing this by mistake, but practice gradually made this happen less often. The graphics weren't exceptional, but more than adequate and the Martians seemed slightly lovable little guys (even if they were baddies).

Let's stick with Romik for the next tape, *Time Destroyers* by Clifford Ramshawe.



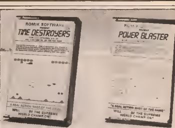
the same price but needing expansion of 3 8 or 16K Romik has tended to standardise the keys if you're not using a joystick — full marks for that and they've selected sensible keys as well, using A S D F1 and F7 for the various directions and for Firing — but how anyone plays with keys once they've used the joystick is beyond me And as with almost all these games there are various levels of skill, although *Time Destroyers* just adds more baddies whereas other games such as *Power Blaster* tend to increase speed as well

Once the instructions are passed, the game goes on *Loading* for a long while — the screen fills with disturbing garbage which might put a few people off — then finally clears and asks which level you'd like to play I picked 1 as usual, and found I was in another of those games where my spaceship is skimming over the surface of a planet with aliens swooping in to bomb while all I can do is fly along trying to shoot them first As I've said before I'm hopeless at this sort of game but if I try to remain dispassionate how does this version differ from others?

Well for a start this time the aliens are trying to airlift atomic powerplants from the surface of Mars so you have to zap them out of the sky before they can get the powerplants away and turn from green meanies into purple super-meanies As the skill levels increase you meet spacecraft buzzers, magnetrons and the mothercraft! But the basic essence of the game is the same you just fly along trying to kill them before they kill you You have three lives, rather unimaginative bolts of power, but your ship will turn round and go the other way if you miss out on a baddie Sadly, I wasn't inspired by this Romik version

"Blast 'em when you see 'em!"

With my trigger finger feeling a bit sore, I moved on to another Jeff Minter goody from Llamasoft called *Laser Zone* This is quite the most skilful zap game I've seen, requiring a high degree of concentration This time you have two spaceships to control one on the horizontal and one on the vertical axis of a board shaped like a



graph The ships can only move along their lines and to make it even harder each ship must be positioned over a small mark to enable it to fire Thus if the horizontal ship is over a firing mark while the vertical isn't then only the horizontal ship will fire whilst if both are over marks then both will fire

By a neat trick of joystick control, it is possible to make one ship or the other tilt through 45 degrees to fire — a deadly cunning manoeuvre if you can get it right. The purpose of this is to blast the aliens (looking like a bunch of fugitives from a horror movie) before they can get either of your ships

The game is so hard to play that you actually get a training program in ship movement (essential prior to serious playing) and then you're off This game must be the best I've seen of this type yet, and almost converted me away from the adventure game

The packaging is far superior to most software at this price (£6) and the instructions are clear concise and extremely helpful Once again we get some good Minter tips to help us like *Blast em when you see em* and there are 31 skill levels! There are other goodies in this game but I've said enough I recommend this game highly, and for those of you who do buy it I'll let you find out the extra thrills for yourself Not an easy game to master — but terrific fun getting there

And what game have I left to last? Another firepower game, to be sure, but one with a neat twist This is *Kaktus* from Audiogenic at £7 95 (needs 8K expansion) and is perhaps the neatest twist on the Invaders type whilst retaining the basic concept This time you are a gopher (and to their credit the people who write the instructions actually say believe it or not before telling you that) You are mainly underground firing a cannon through holes in the ground at wasps and hornets who are trying to get at a cactus that you must save from destruction Occasional moles zoom along and try and block up your holes to stop you firing and buzzards drop nasty eggs on you but through it all you just keep firing

Of course the rationale is plain ridiculous (after all have you ever heard of a gopher firing a cannon?) but as usual that doesn't matter one little bit All that matters is that you keep your finger on the firing button It's a good game, fast and furious with reasonable graphics and a level of skill that doesn't keep the idiots like me from giving up at the start I found it not as skilful as *Laser Zone* but in some ways more enjoyable — and it was a welcome change not to be zapping aliens out of a black Martian sky

And so we pause exhausted and tired right index finger still twitching eyes strained and heart pumping I'm definite in my own mind that the standard of Vic software is increasing in quality not in leaps and bounds but in small and sure stages with one or two gems still standing out of the crowd I feel even the zap and pow games are getting better as well and I'm not so superior about them as I used to be But most of all — I'm flaked ■

Firm	Program	Cost	Value (1-10)
Llamasoft Software 49 Mount Pleasant Tadley Hants	*Abductor* *Laser Zone*	£6 00 £6 00	5 9
Audiogenic Ltd PO Box 88 Reading Berks	*Kaktus*	£7 95	8
Romik Software 24 Church Street Slough SL1 1PT	*Power Blaster* *Time Destroyers*	£9 99 £9 99	7 4



CP software
Spectrum software
Specialists in high quality, intelligent games
CP SOFTWARE
SUPER CHESS II
For Sinclair 48K SPECTRUM
THE BEST AT £7.95
● Six levels of play ● Plays a variety of openings e.g. French Defense, Sicilian Defense, Ruy Lopez, Queen's Gambit etc ● Self play mode ● Analyse mode ● Enhanced end game play ● Recommended move option
NOW for the JUPITER ACE Superchess II £11.95
SEE US AT THE 7th ZX MICROFAIR ALEXANDRA PALACE
SPECTRUM BRIOGE TUTOR
Improve your Bridge with Spectrum Bridge Tutor. Uses the Acol bidding system including Blackwood and Stayman conventions. Each of the 40 hands illustrates a particular aspect(s) of the bidding and play. Following the card play is an explanation of those aspects highlighted in the hand. The correct bid and play must be made in order to progress but a help feature is included
For 16k and 48k Spectrum –
Beginners (40 hands) £5.95
Advanced (40 hands) £5.95
ORIGINAL SUPERCHESS
10 levels of play, plus many features
16k ZX81 £4.95
48k Spectrum £4.95
NOW
16k SUPERCHESS £6.95
The best 16k Spectrum Chess program. 3 levels of play with playing strength similar to the 48k version's first three levels. Analyse mode, plays several openings e.g. Queens Gambit, Ruy Lopez, plus more features. Runs on 16k and 48k Spectrum
COLOSSAL CAVES (Adventure 1 by Abersoft)
Enter the Colossal Cave, discover the treasure left by the wizard. On your travels you will meet dragons, snakes, trolls and other denizens of the underworld. Be warned this adventure can be addictive. Includes a save facility so that the adventure can be continued from the point reached when saved
48K Spectrum £7.95
ZX DRAUGHTS
10 levels of play, very fast
48k Spectrum £5.95
BACKGAMMON
Very popular
48k Spectrum £5.95
SPECTRUM FORTH
FORTH – 10 times faster than Basic, much easier than machine code. If you want to discover the advantages of Forth or are already converted, Spectrum FORTH is the ideal package. It is cassette based and includes Spectrum Forth, a sample Forth program and comprehensive user documentation. It has all Forth structures and allows full use of the Spectrum's colour hi-res graphics. Specify 16k or 48k when ordering.
16k version about 114 new words can be defined
16k Spectrum £9.95
48k version about 1000 new words can be defined
48k Spectrum £9.95
SNAIL LOGO
An implementation of turtle style graphics. Regardless of age, SNAIL LOGO is an ideal way to explore the concepts of form and design and to learn the associated programming procedures, or just to have fun creating interesting patterns. SNAIL LOGO supports standard Logo commands e.g. Procedures, Repeat, Parameters, Replace. It includes syntax checking and an editor plus other detail features.
★ Speech from the Spectrum 48k
SOFTALK I 'Multiwords' 70 plus words £5.95
SOFTALK II 'Spacegames' 80 plus words £5.95
★ BEEPER AMPLIFIER
Plugs directly to the Spectrum's EAR or MIC socket. Battery powered (not supplied) £5.95
or SAVE £1 when ordered with any program
Please add 35p for p&p
UK Prices include post & packing. Despatch within 48 hours of receipt of order
(For orders outside UK add 80p for postage)
Send SAE for catalogue
Send cheque or postal order to
CP SOFTWARE, Dept W4, 17 Orchard Lane, Prestwood, Bucks. HP16 0NN
Also available from
Buffer Microshop – Streatham, London
Philip Copley – Ossett, West Yorks
Georges – Bristol
Screen Scene – Cheltenham
WH Smith – Computer Branches
ZEDXTRA – Kinsen, Bournemouth
Computers of Wigmore Street, London
Fal-Soft Computer – Falmouth
TOP RATES PAID FOR HIGH QUALITY PROGRAMS – .
SEND YOUR MATERIAL FOR EVALUATION AND PROMPT REPLY.

All along the line . . .

Keith Wardle presents a line control game for the BBC A and B

This program *Voida* is a game for the BBC micro which Runs on both Model A and B

The objective of the game is to control a diagonally moving line, while avoiding oncoming vertical lines. To change the direction of your line simply press any key

You start the game with three lives — one is lost each time you hit an oncoming line. Speed increases as the game progresses. If required, difficulty can be increased by adding the following lines

115 FOR R% = 1 TO (either 2 or 3)

185 NEXT

At the end of the game your score is displayed. To restart the game, press the red f1 key

Line description

10	Select MODE 7 for introductory text.
20	Delete cursor
30	Print text (lines 340-540)
40	Set up function key 1 to restart game
50	Select MODE 4 for game display
60	Delete cursor
70	Set Z% (position of diagonal line)
80	Set Y% (how much to move Z%)
90	Set K% (score) to zero
100	Set L% (number of times vertical lines have been hit) to zero
110	Start game loop
120	Pick random number
130	Move graphics cursor
140	Draw vertical line
150	Scroll screen downwards
160	Check to see if diagonal line has hit vertical line
170	Calculate delay period (low if score is high and vice versa)
180, 190, 200	Execute delay
210	Has a key been pressed?
220	If so change direction
230	Clear buffers
240	Move graphics cursor to present position of diagonal line
250	Calculine new position of diagonal line
260	Is diagonal line off right hand side of screen?
270	Is diagonal line off left hand side of screen?
280	Draw new section of diagonal line.
290	Make a sound
300	Add 1 to score
310	Continue if not hit three times.
320	Otherwise print score
330	End program
340-540	Introductory text.

```
L.
   10 MODE7
   20 VDU23;8202;0;0;0;
   30 PROCTEXT
   40 *KEY1|MG.50|M
   50 MODE4
   60 VDU23;8202;0;0;0;
   70 Z%=640
   80 Y%=32
   90 K%=0
  100 L%=0
  110 REPEAT
  120 A%=RND(39)*32
  130 MOVEA%,992
  140 DRAWA%,1005
  150 VDU30,11
  160 IF POINT(Z%,520)=1 THEN L%=L%+1:SOUND2,-15,123,1
  170 J%=(800-K%) DIV 100
  180 B%=TIME
  190 REPEAT
  200 UNTIL TIME>=B%+J%
  210 P%=INKEY(0)
  220 IF P%<>-1 THEN Y%=-Y%
  230 *FX15,0
  240 MOVEZ%,512
  250 Z%=Z%+Y%
  260 IF Z%>1248 THEN Y%=-Y%:Z%=1248
  270 IF Z%<32 THEN Y%=-Y%:Z%=32
  280 DRAWZ%,544
  290 SOUND0,-12,1,1
  300 K%=K%+1
  310 UNTIL L%=3
  320 PRINTTAB(5,9)"Score = ";K%
  330 END
  340 DEFPROCTENT
  350 PRINTTAB(12,7)CHR$131CHR$141"V O I D A"
  360 PRINTTAB(12,8)CHR$131CHR$141"V O I D A"
  370 P%=INKEY(750)
  380 CLS
  390 PRINT''CHR$133"In this game you are the diagonally"
  400 PRINTCHR$133"moving line and must avoid the oncoming";
  410 PRINTCHR$133"lines. To change direction all you need";
  420 PRINTCHR$133"do is press any key."
  430 PRINT'CHR$130"You are given three lives to"
  440 PRINTCHR$130"start with and each time you"
  450 PRINTCHR$130"collide with the oncoming"
  460 PRINTCHR$130"lines a life is lost and a"
  470 PRINTCHR$130"sound will occur."
  480 PRINT'CHR$134"At the end of the game your"
  490 PRINTCHR$134"score will be displayed"
  500 PRINT'CHR$131"To restart the game press the red key"
  510 PRINTCHR$131"marked"CHR$129"f1"
  520 PRINT''CHR$136"Press any key to start the game"
  530 A=GET
  540 ENDPROC
```

Sinclair ZX Spect

The growing range of Spectrum Software



You'll know already that the Spectrum has generated an enormous range of peripherals and independent software. Our own range is growing very fast and is shown in the Sinclair Software Catalogue – *free* with every ZX Spectrum.

The Pit — part one

***Paul Sellin** presents* The Pit *— a three-part text adventure for the 16K Spectrum*

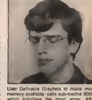
Writing an adventure game is not nearly as difficult as it may appear, as long as you always remember to keep the different parts of the program in their own separate blocks. It is always a good idea to keep a list of where each section starts, together with a note of all the variables, strings and their uses.

The program printed here is called *The Pit* and is a text adventure game written to fit into a 16K ZX Spectrum. There is no reason why the program cannot be typed into any other machine, as long as any differences in the Basic, such as *Print At*, *Drawing* and String Slicing are taken into account.

In order to write an interesting program within the memory available, various space-saving ideas are used. The most obvious of these is the use of multi-statement lines, which on the Spectrum can be of any length, although in practice they are nearly always brought to an end by an *If ... Then* statement. Other machines whose Basic includes *If ... Then ... Else* can of course get round this problem if even longer lines are required.

Throughout the length of the game, the computer stores a 'map' of the playing area in a character array. In this program the game can be played on four levels, each of 20 rooms by 10 rooms. This means that the array is dimensioned by the command *Dim(4,10,20)* which can be thought of as four pages of a book, each one containing 10 rows of letters and each row containing a line of 20 letters.

The player enters on page one and moves around the rows or columns on that page. Line 100, after *Clearing* out the



User Definable Graphics to make more memory available, calls sub-routine 9000 which initialises the main array. After printing up the title and credits, the computer dimensions the array and then proceeds to fill it with the monsters and nasties which you will come up against later.

The *For ... Next* statement, using *z* as the control variable, makes the program fill

```
100 CLEAR PEEK 23732+256*PEEK 2
3733: GO SUB 9000: CLS : PRINT "
You are now in The Pit....": LET
 s=20: LET p=20: LET d=20: LET 1
=20: LET fl=10: LET l=0: LET s1=
1: LET ar=INT (1+RND*4): LET p$=
" ": LET y$=" "
1000 POKE 23692,255: IF INKEY$<>
"" THEN GO TO 1000
1002 LET p$=INKEY$: IF p$="" THE
N GO TO 1002
1003 IF INKEY$="s" THEN GO SUB 9
200
1004 IF INKEY$="f" THEN GO TO 27
00
1005 IF INKEY$="t" AND y$="the R
une Staff" THEN PRINT "Ready to
 Teleport,"'': GO TO 2200
1010 LET oy=y: LET ox=x: LET y=y
+(p$="6" AND y<10)-(p$="7" AND y
>1): LET x=x+(p$="8" AND x<20)-(
p$="5" AND x>1): IF s<1 THEN GO
TO 9800
1011 IF CODE p$<53 OR CODE p$>56
 OR (oy=y AND ox=x) THEN GO TO 1
000
1015 PAPER 5: PRINT "You move ";
: IF p$="7" THEN PRINT "north."
1017 IF p$="6" THEN PRINT "south
."
1018 IF p$="5" THEN PRINT "west.
"
1019 IF p$="8" THEN PRINT "east.
"
1020 PAPER 7: PRINT '"You are at
 ";x;",";y: LET z$=a$(z,y,x): RE
STORE 1500+CODE z$: READ o$,e: I
F o$="x" THEN GO TO e
1532 PRINT '"You have found ",o$
: GO TO e: DATA "an empty room",
1900
1542 DATA "x",8000
1563 DATA "x",2000
1595 DATA "some loot",2400
1599 DATA "an ancient chest",250
0
1602 DATA "some fleres",8900
1609 DATA "x",3000
1618 DATA "an unscrupulous Trad
er",3500
2010 LET a$(z,y,x)="a": RESTORE
2030: FOR h=1 TO 1+RND*5: READ p
$: NEXT h: PRINT "You have found
... "'TAB 3,;p$( TO LEN p$-1). I
```

'pages one to four in turn (throughout the program the variable *z* is used as the level or page number which the player is on) *o$* contains the five characters which will be put on to the array first The *For Next* loop containing *h* slices *O$* to produce one of its five characters each time round, so when *h=1* then *p$=o$(1)* or £ and when *h=2* then *p$=o$(2)* or *f* etc up to *h=5* inclusive

There is a second loop inside the *h* loop made by the *For Next* statement containing *e* as its control variable For each count of *h* this loop is set up to count *e* from 1 to a number between 8 and 13 For every loop of *e* one space in the specified page of the main array *a$* is filled with the character present in *p$* This puts the characters *£ f,! c,?* into a random position on that page any number of times between 8 and 13

Next, the monsters must be added The *e For Next* loop is set up again this time to increment *e* from 1 to between 20 and 25 (ie, there will be more monsters on each page than any of the other five characters) After that has finished looping the *e* loop is set up a final time to add between 3 and 6 * or gems per page

When the *e* loop has finished it means that one of the four pages has been filled with varying numbers of the seven characters. When the computer meets the *Next z* command it increases *z* to two and repeats the whole process filling up page 2, and so on until *z* is greater than 4

Notice that when calculating the random positions in the array, *1* is added to *Rnd+9*, etc to prevent a low value of *Rnd* from producing a result of zero — this would cause the program to crash when the computer tries to find the part of the array with a subscript of zero

Just before the subroutine *Returns* to line 100 it sets up the variables *z, y* and *x* which record the player's position These variables will always be used for the 'page' number *(z)*, row number *(y)* and column number *(x)* respectively

At the start of the game the player is placed at position 10 of the first row of page 1 Also notice that that position in the main array is made empty, or equal to a space so that the room with the entrance will not contain any monsters

On returning from the subroutine the variables which will be used to keep note of the player's condition throughout the game are set up These are *s* for strength, *p* for psi power (for spells, etc), *d* for dexterity and *i* for intelligence all initially set at 20 The game ends if your strength *s* ever drops to zero or below

The other variables are *fl* the number of flares you carry, *l* the amount of loot you have, *al* whether you have sight or not (*al* =1 or 0) and *ar*, your armour, ranging from 1 (weak armour) to 5 (strong armour) *p$* and *y$* are string variables used later in the game

So now we have set up the game ready to play, with a complete map of the area in the computer's memory and the players poised to enter Next week we shall create the most dangerous part of an adventure game the monsters ■

■ *The Pit* has been split into three parts Enter part 1 of the program now and *Save* it on tape Part 2 will be published next week. You will need to enter all three parts of the program before Running it

```
F p$="nothing9" THEN GO TO 6000
2013 IF y$=" " THEN PRINT '"It's
 yours!" LET y$=p$ GO TO 5000
2015 PRINT '"You already have ",
 INVERSE 1'y$( TO LEN y$-1), INV
ERSE 0' Do you want to swap it f
or the", INVERSE 1'p$( TO LEN p$
-1). BEEP .3,24 PAUSE 1 PAUSE
0. IF INKEY$<>"n" THEN PRINT "It
's yours!" LET y$=p$ GO TO 500
5
2030 PRINT "OK."' GO TO 1000 D
ATA 'the Avril stone9","nothing0
","the Gem of Grune1","the orb o
f Zot4","the Rune Staff4","the f
lame of Plathe3"
2200 INPUT "Co-ords to teleport?
 (x,y) ",x,,y INPUT "Level?",z
IF l>1500 AND y=1 AND x=10 AND z
=1 THEN GO TO 9900
2210 IF x<1 OR y<1 OR x>20 OR y>
10 OR z<1 OR z>4 THEN BEEP .5,-1
0 GO TO 2200
2215 BEEP 2,24 GO TO 1020
2400 BEEP .05,12 BEEP .05,12. B
EEP .1,24. LET e=1+INT (RND*30)
 LET l=l+e PRINT "You have foun
d ",e'' LET a$(z,y,x)=" ". GO T
O 6005
2505 LET a$(z,y,x)="*" PRINT FL
ASH 1,"Anything to do?" PAUSE 1
 PAUSE 0. IF INKEY$<>"o" THEN P
RINT "OK."' GO TO 1000
2510 RESTORE 2530 FOR h=1 TO 1+
RND*6 READ x$ NEXT h PRINT "Y
ou have found... "'TAB 2,.x$. IF
 x$<>"nothing" THEN IF x$( TO 5)
<>"a set" THEN GO TO 2540
2514 IF x$="nothing" THEN GO TO
1000
2515 LET e=12-INT (RND*16) PRIN
T "To what do you want to add yo
ur bonus?" PAUSE 0 IF INKEY$="
i" THEN LET i=i+e. GO TO 2520
2516 IF INKEY$="d" THEN LET d=d+
e GO TO 2520
2517 IF INKEY$="s" THEN LET s=s+
e GO TO 2520
2518 IF INKEY$="p" THEN LET p=p+
e GO TO 2520
2519 PRINT "OK."' GO TO 1000
2520 PRINT "You got ";e;" bonus
points!" LET p$=" ". LET a$(z,y
,x)="a": GO TO 6000
```

Direct access . . .

***Peter Forward** explains how to access block graphics from the keyboard*

All 16 graphic blocks can be printed on demand, in any of eight colours, together with cursor movements directly from the keyboard

The Dragon 32 block graphics can normally only be accessed using the rather cumbersome *Print Chr$( )* function which makes the construction of games, figures and screen layouts time-consuming, and is particularly difficult for novice programmers This machine code utility allows the direct entry of block graphics into print statements and strings

The Basic program in Figure 1 should be typed in paying particular attention to the contents of lines 60000 to 60050 It is a good idea to *Save* a copy of the program at this stage just in case you have made an error which will cause the computer to 'hang up when the program is Run

After Running the program the graphics mode can be entered at any time by pressing *Shift* ↑ The keys *1* to *8* will select the print colour the keys *A* to *P* will input the 16 graphics blocks and keys *Z,X,V* and *Q* the cursor movements

To enter graphics in your print statements type in the normal way, then when graphics are required operate the *Shift* ↑ Next, type in the graphics and before closing the quotes operate the *Shift* ↑ again to return the keyboard to its normal mode to finish your program line The *Shift* ↑ can be used at any time to toggle into, and out of the graphics mode However, operating *Return* will always reset the keyboard for normal operation

When in the graphics mode, the space bar and the ← (delete) key still retain their normal functions, but other keys will be ignored

The inclusion of cursor movements (keys *X,Z V O,* being *Down Up, Left Right*) allows you to design complete figures such as chess pieces invaders etc directly into the program line Once the complete figure is given a string label simply print it on demand using the *Print* or *Print@* functions If you overwrite your drawing then due to the Basic interpreter the cursor will print a space on your masterpiece Don't worry — when your program is Run or *Listed* you will see that all is well!

The Basic program is used to *Load* a machine code routine into the protected high memory of your computer — it assumes that your own program will start at line 40 onwards This utility uses the fact that on entering the printout routine in Rom at *B54AH* there is a jump to Ram at *0167H* which normally contains an *Rts* (return from subroutine) instruction Line 30 of the Basic program modifies this to jump to the new routine that you have entered starting at *7D01H* which modifies the key value A full listing is given in Figure 2

Note that in line 10 the '200 should be modified to allow the string space required by your program Also, the reserved memory space from *7E00H* to *7FFFH* is available for your own machine code routines or to extend the above program to include other key controlled functions ■

FIGURE 1

```
BASIC PROGRAM LISTING :keyboard graphics routine for DRAGON 32

1 REM *** KEYBOARD GRAPHICS-PETER FORWARD-COPYRIGHT 1983 ***

10 CLEAR 200, 32000

20 FOR T = 32001 TO 32226:READ A$:B$="&H"+A$:C=VAL(B$):POKE T,C:NEXT

30 POKE &H167,&H7E:POKE &H168,&H7D:POKE &H169,&H01:POKE &H7DF3,&H3F

59999 END

60000 DATA 81,05,26,04,7F,7D,F2,39,81,20,28,01,39,81,08,
      26,01,39,81,5F,20,06,73,7D,F2,86,00,39,7D,7D,
      F2,26,01,39,81,41,25,00,81,50

60010 DATA 22,46,80,7D,F3,20,12,12,81,32,26,04,86,4F,20,
      32,81,33,26,04,86,5F,20,2A,81,34,26,04,86,6F,
      20,22,81,39,26,04,86,7F,20,1A

60020 DATA 81,36,26,04,86,8F,20,12,81,37,26,04,86,9F,20,
      0A,81,38,26,04,86,AF,20 08,86,3F,B7,7D,F3,00,
      00,39,F7,7D,F4,81,58,26,11

60030 DATA FC,00,88,C3,00,20,10,83,05,FF,23,40,7D,00,00,
      20,3D,81,5A,20,11,FC,00,88,05,00,20,10,83,04,
      00,25,E2,FD,00,88,20,28,81,51

60040 DATA 26,11,FC,00,88,C3,00,01,10,83,05,FF,22,1E,FD,
      00,88,20,13,81,56,26,12,FC,00,88,05,00,01,10,
      83,04,00,25,E3,FD,00,88

60050 DATA F6,7D,F4,86,00,39,06,00,89,B7,7D,F5,86,0D,8D,
      A0,4D,86,7D,F5,B7,00,85,80,80,F6,7D,F4,39
```

continued on page 25

More exciting programme than Top of the Pops, Luxembourg and Radio 3 all rolled into one.



Composer is an exciting new music program for VIC 20 owners.

Pop in the program and you'll see two staves of music appear on your screen, all ready for the notes of your new hit-tune. (Even without previous musical experience you'll be surprised how easy it is!)

Use the keys on the top row of the keyboard and as they play you'll see them appear as notes on the screen. You can put in sharps and flats by using the shift key, and change the length of any note just as you would on a piano.

When you're happy with your tune, you can play all of it back and even store it on your tape recorder.

Very soon you'll have a whole concerto or catchy album track.

And if that sounds good just listen to the price. £11.50 for the complete program.

Send in the coupon right away. Ready to start on your next big hit!

COMPOSER. THE MUSIC PROGRAM FOR VIC 20.

Available soon from all good software dealers

OR SEND FOR FULL PROGRAM DETAILS
From MMS Ltd
Goddard Road Whitehouse
Industrial Estate, Ipswich
Suffolk. IP1 5NP
Tel. No. 0473 462721



Send this coupon to Marketing Micro Software Ltd., FREEPOST, Ipswich IP1 5BR.

QTY	PROGRAM	PRICE	TOTAL £
	Composer	£11.50	
		Plus P&P	0.50
		Total (VAT inclusive)	

Prices apply to U.K. only. Export prices on application.

FREEPOST No stamp needed in UK.

I enclose a cheque/postal order payable to: Marketing Micro Software Ltd

£ ____________

OR Please charge to my Access/Barclaycard

No ____________

Signature ____________

PLEASE USE BLOCK CAPITALS

Name ____________

Address ____________

Co. Reg. No. 1694320.

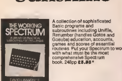
PCW 195

FIGURE 2 - MACHINE CODE LISTING : Keyboard graphics routine

```
7D01  START    81 0D        CMPA #0D
               26 04        BNE SPACE
               7F 7D F2     CLR 7DF2
               39           RTS
      SPACE    81 20        CMPA #20
               26 01        BNE DELETE
               39           RTS
      DELETE   81 08        CMPA #08
               26 01        BNE TOGGLE
               39           RTS
      TOGGLE   81 5F        CMPA #5F
               26 08        BNE TEST
               73 7D F2     COM 7DF2
               86 80        LDA #80
               39           RTS
      TEST     7D 7D F2     TST 7DF2
               26 01        BNE KEY
               39           RTS
      KEY      81 41        CMPA #41
               25 0A        BLO COLOR2
               81 80        CMPA #80
               22 46        BHI CURSOR
               BB 7D F3     ADDA 7DF3
               39           RTS
               12           NOP
               12           NOP
      COLOR2   81 32        CMPA #32
               26 04        BNE COLOR3
               86 4F        LDA #4F
               20 22        BRA COLOR
      COLOR3   81 33        CMPA #33
               10 83 05 FF  CMPD #05FF
               22 49        BHI NEWLINE
               FD 00 88     STD 0088
               20 30        BRA EXIT1
      UP       81 5E        CMPA #5E
               26 11        BNE RIGHT
               FC 00 88     LDD 0088
               83 00 20     SUBD #20
               10 83 04 00  CMPD #0400
               25 E2        BLO ADDLINE
               FD 00 88     STD 0088
               20 20        BRA EXIT1
      RIGHT    81 51        CMPA #51
               26 13        BNE LEFT
               FC 00 88     LDD 0088
      ADDONE   C3 00 01     ADDD #01
               10 83 05 FF  CMPD #05FF
               22 1E        BHI NEWLINE
               FD 00 88     STD 0088
               20 13        BRA EXIT1
      LEFT     81 56        CMPA #56
               26 12        BNE EXIT2
               FC 00 88     LDD 0088
               83 00 01     SUBD #01
               10 83 04 00  CMPD #0400
               25 E2        BLO ADDONE
               FD 00 88     STD 0088
      EXIT1    F6 7D F4     LDB 7DF4
      EXIT2    86 00        LDA #00
               39           RTS
      NEWLINE  B6 00 88     LDA 0088
               B7 7D F5     STA 7DF5
               26 04        BNE COLOR4
               86 5F        LDA #5F
               20 2A        BRA COLOR
      COLOR4   81 34        CMPA #34
               26 04        BNE COLOR5
               86 6F        LDA #6F
               20 22        BRA COLOR
      COLOR5   81 35        CMPA #35
               26 04        BNE COLOR6
               86 7F        LDA #7F
               20 1A        BRA COLOR
      COLOR6   81 36        CMPA #36
               26 04        BNE COLOR7
               86 8F        LDA #8F
               20 12        BRA COLOR
      COLOR7   81 37        CMPA #37
               26 04        BNE COLOR8
               86 9F        LDA #9F
               20 0A        BRA COLOR
      COLOR8   81 38        CMPA #38
               26 04        BNE COLOR1
               86 AF        LDA #AF
               20 02        BRA COLOR
      COLOR1   86 3F        LDA #3F
      COLOR    B7 7D F3     STA 7DF3
               86 00        LDA #00
               39           RTS
      CURSOR   F7 7D F4     STB 7DF4
      DOWN     81 0A        CMPA #0A
               26 11        BNE UP
               FC 00 88     LDD 0088
      ADDLINE  C3 00 20     ADDD #20
               86 0D        LDA #0D
               BD B5 4D     JSR B54D
               B6 7D F5     LDA 7DF5
               B7 00 88     STA 0088
               86 00        LDA #00
               F6 7D F4     LDB 7DF4
               39           RTS
```

7DF2 = GRAPHICS TOGGLE 7DF3 = COLOUR ADD 7DF4 = B STORE
7DF5 = A STORE

Better books from Sunshine



A collection of sophisticated Basic programs and subroutines including Unifile, Renumber (handles Gotos and Gosubs) education, accounts, games and scores of essential routines. Put your Spectrum to work with what must be the most comprehensive Spectrum book. 248pp **£5.95***

Some of the more advanced programs in this collection include a word processor and text editor, a music and sound synthesiser, a sprite editor and a program which allows you to enter high resolution graphics mode. This is not available in the standard Basic. 160pp **£5.95***





This computer has capabilities far beyond most other computers in this price bracket. With this collection of Basic programs and routines David Lawrence introduces word processing, music and shows you how to mix text and high resolution graphics. As with the other books in this series each program is built up out of re useable subroutines. 160pp **£6.95***

*Available through W H Smith's and computer dealers

Trade enquiries welcome

SUNSHINE

Please send me

- ☐ **The Working Spectrum** at £5.95 each
- ☐ **The Working Commodore 64** at £5.95 each
- ☐ **The Working Dragon 32** at £5.95 each

I enclose a cheque/postal order for £ ______________
payable to **Sunshine Books** 19 Whitcomb Street London WC2 7HF

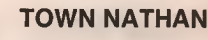
Name ______________________________

Address ______________________________

____

Signed ______________________________





Dragon Byte

Home Computers Software and Games

51a Queen Street
Morley
Leeds
Tel 0532 522690

ZX SPECTRUM now under £100

Ring for more information

Last Chance

10 Ash Road
Headingley
Leeds 6
Tel 744235

Home computers, software board games, role-playing games and books

At Last a place we make you offers you can't refuse

We're worth a visit because:

- ★ We've probably the best range of software in the North — and we're improving all the time
- ★ We've a growing range of computers, peripherals, upgrades and books
- ★ We've the biggest range of Citadel figures for leagues around
- ★ We've board and adventure games for all ages from TSR Games Workshop, Avalon Hill Victory Games, GDW, Yaquinto, etc, etc

PROGRAMMERS — Assassin Software needs your marketable programs. Give us a call

Heavenly bodies . . .

***Nick Butler** plots the orbits of Earth, Venus and Mercury around the sun*

This program is designed to show the orbits of the three planets closest to the sun — Mercury, Venus and Earth (together with its orbiting moon). The program is written for a BBC model B but you can adapt it for a model A by changing line 140 to mode 4 and line 470 to *Gcol 0,1*.

The sizes of the planets relative to each other are approximately correct, although the sun is out of proportion.

The time taken for the orbit of each planet is: Mercury — 88 days; Venus — 255 days; Earth — 365 days (the moon orbits the Earth once every 30 days).

The main section of the program is contained in lines 200-330. Line 210 calculates the Earth's position, which is printed by line 230. The procedures to print the moon, Venus and Mercury are called in lines 240-260. A 1/10 second delay is called in line 270 while lines 280-300 over-print the moon, Venus and Mercury in their logical inverse colours, ie, black. Finally, line 310 over-prints the Earth.

Program notes

- 150 Calls procedure which sets all variables and defines characters
- 160 Calls procedure which asks whether you want to plot the courses
- 170 Causes characters to be printed at the graphics cursor
- 180 Calls procedure to draw the Sun.
- 200- 330 Draws Earth. Calls procedures to draw and erase the Moon, Venus and Mercury. Erases Earth
- 270 Causes a pause (10/100 sec) before continuing — to increase or decrease the speed of action, change the number
- 350- 410 Procedure to draw the moon (relative to the Earth)
- 480- 540 Procedure to draw the Sun (uses Plot 85 for speed)
- 560- 650 Procedure to initialise all variables used
- 670- 770 Procedures to draw and delete Venus
- 790- 840 Procedure to delete the moon
- 860- 950 Procedures to draw and delete Mercury
- 960-1040 Procedure to ask whether the courses of the planets should be plotted or not.

Variables used

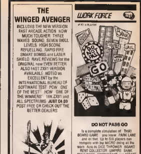
EDX — Degrees from Earth's starting point (this is automatically set back to 0 when it has completed each orbit)
PX — 'X' position of Earth
PY — 'Y' position of Earth
P — Variable for course printing speed
MOX — 'X' position of the moon
MOY — 'Y' position of the moon
MX — Degrees from moon's starting point.
POX — 'X' position of Venus
POY — 'Y' position of Venus
MEX — 'X' position of Mercury
MEY — 'Y' position of Mercury ■

```
>cC
   10 REM *******************************
   20 REM *                             *
   30 REM *         O R B I T S         *
   40 REM *                             *
   50 REM *  (Earth,Moon,Venus,Mercury) *
   60 REM *                             *
   70 REM *            ***              *
   80 REM *                             *
   90 REM *         by N.Butler         *
  100 REM *                             *
  110 REM *******************************
  120 REM
  130 REM
  140 MODE1
  150 PROCinit
  160 PROCask
  170 VDU 5
  180 PROCsun
  190 REM   ** MAIN LOOP **
  200 FOR EDX=0 TO 360 STEP 2
  210 PX=640+550*SIN(RAD(EDX)):PY=512+190*COS(RAD(EDX))
  220 IF P=1 PLOT 69,PX,PY
  230 MOVE PX,PY:PRINTCHR$(225)
  240 PROCmoon
  250 PROCvenus
  260 PROCmercury
  270 PROCwait(10)
  280 PROCdelmoon
  290 PROCdelvenus
  300 PROCdelmercury
  310 MOVE PX,PY:PRINTCHR$(225)
  320 NEXT EDX
  330 GOTO 200
  340
  350 DEFPROCmoon
  360 GCOL3,1
  370 MOX=PX+60*SIN(RAD(MX)):MOY=PY+30*COS(RAD(MX))
  380 MOVE MOX,MOY:PRINTCHR$(226)
  390 MX=MX+24
  400 GCOL3,3
  410 ENDPROC
```

```
420
430 DEFPROCwait(T)
440 TIME=0:REPEAT UNTIL TIME>T:ENDPROC
450
460 DEFPROCsun
470 GCOL0,2
480 FOR G=1 TO 20:PLOT 69,RND(1280),RND(1024):NEXT G
490 MOVE 640,510
500 FOR G=0 TO 360 STEP 20
510 MOVE 640,512:PLOT 85,640+50*SIN(RAD(G)),512+50*COS(RAD(G)):NEXT G
520 GCOL3,3
530 ENDPROC
540 MX=0
550
560 DEFPROCinit
570 VDU 23,225,&3C,&7E,&FF,&FF,&FF,&FF,&7E,&3C
580 VDU 23,226,&00,&00,&18,&3C,&3C,&18,&00,&00
590 VDU 23,228,&38,&7C,&7C,&7C,&38,&00,&00,&00
600 VDU 23,227,&00,&3C,&7E,&7E,&7E,&7E,&3C,&00
610 MX=1
620 PLX=0
630 MERC=0
640 VDU 19,3,6,0,0,0:GCOL3,3
650 ENDPROC
660
670 DEFPROCvenus
680 POX=640+362*SIN(RAD(PLX)):POY=512+134*COS(RAD(PLX))
690 MOVE POX,POY:PRINTCHR$(227)
700 IF P=1 PLOT 69,POX,POY
710 PLX=PLX+3.2
720 ENDPROC
730
740 DEFPROCdelvenus
750 POX=640+362*SIN(RAD(PLX-3.2)):POY=512+134*COS(RAD(PLX-3.2))
760 MOVE POX,POY:PRINTCHR$(227)
770 ENDPROC
780
790 DEFPROCdelmoon
800 GCOL3,1
810 MOX=PX+60*SIN(RAD(MX-24)):MOY=PY+30*COS(RAD(MX-24))
820 MOVE MOX,MOY:PRINTCHR$(226)
830 GCOL3,3
840 ENDPROC
850
860 DEFPROCmercury
870 MEX=640+212*SIN(RAD(MERC)):MEY=512+79*COS(RAD(MERC))
880 MOVE MEX,MEY:PRINTCHR$(228)
890 IF P=1 PLOT 69,MEX,MEY
900 MERC=MERC+8
910 ENDPROC
920
930 DEFPROCdelmercury
940 MEX=640+212*SIN(RAD(MERC-8)):MEY=512+79*COS(RAD(MERC-8))
950 MOVE MEX,MEY:PRINTCHR$(228)
960 ENDPROC
970
980 DEFPROCask
990  PRINTTAB(10,3)"O R B I T"
1000 PRINT'''"  Do you want the orbits of the planets traced out (Y/N)"
1010 PATH$=GET$
1020 IF PATH$="Y" P=1:CLS:ENDPROC
1030 IF PATH$="N" P=0:CLS:ELSE GOTO 990
1040 ENDPROC
```


HIRE ZX81/SPECTRUM PROGRAM TAPES
Make the most of your computer by hiring from the original and still the only software library offering all these features
Over 900 tapes stocked offering more than 120 different programs from 39 suppliers (all with their permission)
Includes arcade adventure and simulation games business and home utilities graphics, education and much more
Up to 40 master's original copies of very popular tapes enable us to maintain good service
Descriptive catalogue helps you choose
FREE quarterly illustrated magazine posted to all members
Full-time staff of three offer you a friendly efficient welcome & service
Fortnight's hire for £1 40 inc p/p
All tapes guaranteed loadable help given with associated problems
Overseas branches being set up (Malta already operating)
You may switch from ZX81 to Spectrum membership if you upgrade
Free member-to-member advertising in our magazine
Send SAE for details or join on money-back no-risk approval today


S-L
The SINCLAIR OWNERS'
SOFTWARE LIBRARY
Warren Road, Liss, Hants GU33 7DD
Please enrol me on money-back approval my magazine descriptive library catalogue and order form on the understanding that if I'm not delighted with your service within 28 days you will refund my money in full
NAME
ADDRESS
Please enclose cheque/P O for £8 50 (year's ZX81 membership)/ £9 50 (Spectrum) Overseas £2 extra in each case
PCWK


THE WINGED AVENGER
INCLUDES THE NEW VERSION FAST ARCADE ACTION NOW MUCH TOUGHER THREE WAVES SOUND SEVEN SKILL LEVELS HIGH SCORE REFUELLING RAPID FIRE SMART BOMBS and LASER SHIELD RAVE REVIEWS for the ORIGINAL now EVEN BETTER ALSO FAST ZX81 VERSION AVAILABLE NOTED as EXCELLENT by the INTERNATIONAL BUREAU OF SOFTWARE TEST PCW ONE OF THE BEST HCW ONE OF THE WINNERS' 16K ZX81 and ALL SPECTRUMS JUST £4 50 POST FREE OR CHECK OUT THE BETTER DEALERS
THE WINGED AVENGER
WORK FORCE
HOTEL
BANK
DO NOT PASS
JAIL
GO
DO NOT PASS GO
Is a complete simulation of THAT BOARD GAME you know PARK LANE and all that. Up to SIX players can compete with the MICRO doing all the work Acts as DICE THROWER BOARD RENT COLLECTOR UMPIRE BANK RULE BOOK ACCOUNTANT and ESTATE AGENT Complete with instructions and GARRY'S MAGIC GRAPHICS The ULTIMATE in FAMILY GAMES DON'T MONOPOLISE YOUR MICRO TAKE A TRIP FOR £6 50 48K SPECTRUM Also 16K ZX81 POST FREE OR ASK YOUR DEALER WORK FORCE 140 WILSDEN AVENUE LUTON BEDS

OPEN FORUM

***Open Forum* is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.**

Paint

on Spectrum

This machine code routine can be used to fill in a shape on the screen with pixels of a specified colour.

To enter the hex code into the memory the following *Basic* program should be used

```
10 FOR I=32300 TO 32456
20 INPUT x
30 POKE I,x
40 NEXT I
```

Next run the program and type in the hex numbers, pressing *Enter* after each. When all the code has been entered, it is best to

Save ' Paint ' *Code* 32300 120

before attempting to use the routine.

To use the routine, x and y co-ordinates must be given for the position from which colouring is to begin, that is, a point inside your shape. Therefore it is necessary to

Poke 32500 x co-ordinate
Poke 32501 y co-ordinate

The colour of the pixels is set by *Poke* 32502,attribute (see page 116 of manual).

Having done all this, and drawn your shape, type

Randomize usr 32300

and watch as your artwork is coloured in.

The routine will stop colouring when it can move no further up or down from the original pixel, and will work on the 16K or 48K Spectrum.

The following program incorporating the routine might appeal to modern-art lovers.

```
10 BORDER 0:PAPER 7:INK 0:CLS
20 FOR f=1 TO 50
30 LET x=RND*253+1:LET y=RND*172+1
40 PLOT x,y:DRAW RND*253+1-x,
   RND*172+1-y
50 NEXT F
60 FOR f=1 TO 30
70 LET x=RND*253+1:LET y=RND*172+1
80 IF POINT (x,y)=1 THEN GOTO 70
90 POKE 32500,x:POKE 32501,y
100 POKE 32502,57+INT(RND*7)
110 RANDOMIZE USR 32300
130 NEXT f
```

32300	58	244	126
32303	95		
32304	58	245	126
32307	87		
32308	58	246	126
32311	50	143	92
32314	75		
32315	66		
32316	65		
32317	205	128	126
32320	75		
32321	4		
32322	120		
32323	254	174	
32325	210	93	126
32328	197		
32329	213		
32330	205	206	34
32333	209		
32334	193		
32335	197		
32336	213		
32337	205	213	45
32340	209		
32341	193		
32342	60		
32343	61		
32344	254	1	
32346	194	61	126
32349	66		
32350	75		
32351	205	128	126
32354	75		
32355	5		
32356	120		
32357	254	1	
32359	210	127	126
32362	197		
32363	213		
32364	205	206	34
32367	209		
32368	193		
32369	197		
32370	213		
32371	205	213	45
32374	209		
32375	193		
32376	60		
32377	61		
32378	254	1	
32380	194	94	126
32383	201		
32384	75		
32385	197		
32386	213		
32387	205	229	34
32390	209		
32391	193		
32392	12		
32393	121		
32394	254	255	
32396	210	154	126
32399	197		
32400	213		
32401	205	206	34
32404	209		
32405	193		
32406	197		
32407	213		
32408	205	213	45
32411	209		
32412	193		
32413	60		
32414	61		
32415	254	1	
32417	194	129	126
32420	75		
32421	197		
32422	213		
32423	205	229	34
32426	209		
32427	193		
32428	13		
32429	121		
32430	254	1	
32432	210	208	126
32435	197		
32436	213		
32437	205	206	34
32440	209		
32441	193		
32442	197		
32443	213		
32444	205	213	45
32447	209		
32448	193		
32449	60		
32450	61		
32451	254	1	
32453	194	165	126
32456	201		

Paint
by G R Barnes



Cards

on Commodore 64

This short program for the 64 deals four hands from a standard pack of 52 cards randomly

Program notes

21-24	Allocate suits
25-26	Reduce X to between 1 and 13
30-70	I and II to 13 to AKQJ
100-400	Prints the card

Variables

Z Number of cards dealt
K(I) Flag for card selected
IIK(X) = I then new X is found
IIK(X) = 0 then this X is selected and K(X) = I

```
1 PRINT"♥"
2 POKE53280,2 POKE53281,3
3 GOSUB2000 PRINT"♥"
5 PRINT"▮NORTH","▮EAST","▮SOUTH","
  WEST"
6 PRINT" ─────"," ─────"," ─────","
  ─────"
7 Z=0 DIMK(52) FORI=1TO52 K(I)=0 NEXT
10 X=INT(RND(1)*52+1)
14 IFZ=52THEN1000
15 IFK(X)=1THEN10
16 K(X)=1
21 IFX/4=INT(X/4)THENS$="H"
22 IF(X+1)/4=INT((X+1)/4)THENS$="D"
23 IF(X+2)/4=INT((X+2)/4)THENS$="C"
24 IF(X+3)/4=INT((X+3)/4)THENS$="S"
25 FORI=1TO3 IFX<14THEN30
26 X=X-13 NEXT
30 X$=STR$(X)
40 IFX=11THENX$=" J"
50 IFX=12THENX$=" Q"
60 IFX=13THENX$=" K"
70 IFX=1THENX$=" A"
100 IFS$="C"ORS$="S"THEN400
200 PRINT"▮ "X$S$, Z=Z+1 GOTO10
400 PRINT"▮ "X$S$, Z=Z+1 GOTO10
1000 PRINT PRINT PRINT PRINT"
     ▮ HAND DEALT"
1010 PRINT PRINT PRINT PRINT"
     ▮▮ANOTHER? (Y/N)"
1020 GETA$ IFA$=""THEN1020
1030 IFA$="Y"THENCLR PRINT"♥" GOTO5
1040 IFA$<>"N"THEN1020
1050 PRINT"♥" END
2000 PRINT"                    ▮D E A L"
2010 PRINT"                    ▮▮*********"
2020 PRINT"   THIS PROGRAM WILL DEAL
     FOUR RANDOM         HANDS OF CARS
2030 PRINT PRINT PRINT PRINT"▮▮▮
     PRESS ANY KEY"
2060 GETA$ IFA$=""THEN2060
2070 RETURN
```

Cards
by N F Leigh

Space Blitz

on BBC

This program is for model B. The idea is similar to Blitz but with the complication of anti-aircraft missiles.

The missiles become ever more difficult to avoid as you reach more and more screens. Ten points are scored for each block hit, anti-aircraft missiles score a random number between 20 and 40.

On each screen the city gets larger and a free ship is awarded for every thousand points.

Program notes

64-100	Speed of flash and store high score
120-200	Screen array and set up variables
210-260	Set up city. Z = number of blocks
380-400	Free ship and and move ship
400-640	Ship crashed? and move shot.
500-620	Block hit? Bomb hit missile? Ship hit?
700-800	Increase score decrease ships. Messages
870-1000	Move missile
1120-1180	Instruction missile points
1200-1240	Print block of city reset variables if ship hit

VDU 23,8202;0;0;0; turns off the cursor

My highest score is 2865

PROGRAM OF THE WEEK

```
10 ENVELOPE1,1,5,5,8,100,0,0,0,5,-5,100,5,127
20 SOUND0,1,1,20
40 MODE7
50 *FX9,3
60 *FX10,3
70 ONERRORHX=0:ONERROROFF
80 IFHX>0THEN100
90 INPUT"PREVIOUS HIGH SCORE",HX
100 ONERROROFF
110 CLS:GOSUB1120
120 DIMA(19,30)
130 MODE2
140 VDU23,228,66,153,0,165,165,0,153,66
150 D=0:T=0
160 VDU23,228,16,66,56,56,66,124,130,130
170 J=0
180 XC=0:B=0:C=0:D=0:B=0:F=1:G=0:Z=0:SHIPS=3:WAVE=1
190 K=3
200 *FX11,1
210 FORR=0TO19:FORD=0TO30:A(R,F)=0:NEXT:NEXT
220 VDU23;8202;0;0;0;
230 VDU23,230,255,255,153,153,255,153,153,255,83,255,
    0,240,126,127,126,240,0,0
250 VDU23,231,96,112,120,127,127,265,0,0
260 VDU23,232,0,0,120,248,255,255,0,0
270 COLOUR3:Z=19:FORX=0TO18:PRINTTAB(X,20)CHR$(220);
    :A(X,20)=1:NEXT
280 Y=30
290 Y=Y-1
300 IF Y=12 GOTO370
310 FORX=0TO18:IF A(X,Y+1)=0 GOTO330
320 P=RND(K):IF P<K GOTO340
320 A(X,Y)=0:GOTO350
340 PRINTTAB(X,Y)CHR$(230):A(X,Y)=1:Z=Z+1:SOUND&0010,
    -15,7,1
350 NEXT
360 GOTO290
370 COLOUR1
380 IF XC>1000 SHIPS=SHIPS+1:VDU19,3,10,0,0,0:XC=XC-
    1000
400 VDU30:PRINT" SCORE=";S:TAB(12)"SHIPS=";SHIPS
410 COLOUR0
420 PRINTTAB(G,F)"  ":COLOUR2:SOUND&0010,-10,7,2
430 G=G+1
440 IFG>=19 F=F+1:G=0
450 A$=INKEY$(0):IFA$=" " G=G+1:IFG >=19 F=F+1:G=0
460 *FX15,1
470 PRINTTAB(G,F)CHR$(231)CHR$(232)
480 IF A(G,F)=1 GOTO750
490 GOTO870
500 IF B=1 GOTO540
510 IFA$="Z" GOTO530
520 GOTO370
530 B=1:C=G:D=F:SOUND&0011,-15,253,2
540 R=0
550 COLOUR0:PRINTTAB(C,D)" "
560 D=D+1
570 IF D=31 B=0:GOTO370
580 COLOUR12:PRINTTAB(C,D);CHR$(226)
590 IF A(C,D)=1 GOTO650
600 IF C=0 AND D=T GOTO1170
610 IF G=0 AND F=T GOTO720
630 N=N+1:IF N<3 GOTO550 ELSE GOTO370
650 SOUND&0010,-15,7,4
660 PRINTTAB(C,D)CHR$(228):NOW=TIME:REPEAT UNTIL
    TIME=NOW+20
670 PRINTTAB(C,D)" "
680 A(C,D)=0
690 B=0
700 S=S+10:XC=XC+10:Z=Z-1:IF Z=1 K=K+1:GOTO720
710 GOTO870
720 MODE7
730 PRINT'''CHR$(129)"Well done you have destroyed
    that planet,you must now try to destroy a bigger
    planet."':WAVE=WAVE+1
740 NOW=TIME:REPEAT UNTIL TIME=NOW+300:MODE2:VDU23;
    8202;0;0;0;:G=0:F=1:GOTO270
750 NOW=TIME
760 PRINTTAB(0,F)CHR$(228)CHR$(228)
770 A(G,F)=0
```

continued over the page

```
780 SOUND0,1,1,30
790 REPEAT UNTIL TIME=NOW +150
800 SHIPS=SHIPS-1:IF SHIPS=0 THEN MODE7:PRINTCHR$(131)
     YOU HAVE CRASHED" ELSE PROCBANG:GOTO410
810 PRINTCHR$(129)CHR$(141)"YOUR SCORE IS "!S'CHR$
    (129)CHR$(141)"YOUR SCORE IS "!S:IF HX<S PRINT'
    CHR$(134)"YOU HAVE SET A NEW RECORD":HX=S
820 PRINT"THE RECORD IS ";HX
830 *FX11,66
835 *FX15,1
840 PRINTCHR$(135)"ANOTHER GAME(Y/N)":INPUTQ$:IF Q$=
    "N"THEN END
850 MODE2
860 GOTO180
870 IF J=1 GOTO930
880 J=0:T=11:Q=RND(19)
890 T=T+1:IF A(Q,T)=1 GOTO920
900 IF T<30 GOTO890
910 GOTO500
920 J=1:T=T-1
930 N=0
940 COLOUR0
950 IF A(Q,T)=1 GOSUB1200 ELSE PRINTTAB(Q,T)" "
960 IF WAVE>2 THENQ=Q+SGN(S-Q)
970 IF WAVE=2 THEN Q=Q+(RND(3)-2)
980 IF Q<0 Q=0
990 IF Q>18 Q=18
1000 T=T-1:IF T=0 GOTO1100
1010 SOUND&0011,-14,121,1
1020 COLOUR6
1030 J=1
1040 IF Q=S AND T=F GOTO1090
1050 IF Q=S+1 AND T=F GOTO1090
1060 PRINT TAB(Q,T)CHR$(229)
1070 N=N+1:IF N=2 GOTO500
1080 GOTO500
1090 J=0:GOTO780
1100 J=0:T=0
1110 GOTO500
1120 PRINTCHR$(129)CHR$(141)TAB(12)'SPACEBLITZ''CHR$
     (129)CHR$(141)TAB(12)'SPACEBLITZ"''
1130 PRINT"You have been called upon to serve ''"the
     empire in the Inter galectic bombingforce.'''"You
     have been called out on a dangerous attack
     mission on alien planets"''
1140 PRINT"You must destroy the planet before you
     crash or destroyed by alien anti_attack missiles
     as you dive and circle the      planet's inhabited
     areas"'
1150 PRINT"THE CONTROLS ARE:_''"Z________DROP ATTACK
     UNITS"''"SPACE BAR-SPEED UP"''CHR$(129)"GOOD LUCK"
1160 X=GET:RETURN
1170 PRINTTAB(C,D)CHR$(228):S=0:J=0:DS=RND(40)+20:S=S
     +DS:XC=XC+DS
1180 SOUND&0010,-15,121,7
1190 PRINTTAB(C,D)" ";GOTO370
1200 COLOUR3
1210 PRINTTAB(Q,T)CHR$(230):RETURN
1220 DEFPROCBANG
1230 PRINTTAB(S,F)"  "
1240 S=0:F=I
1250 ENDPROC
```

Space Blitz
by Stuart Arnell

Morse

on Vic20

This program translates English (or any other language) into Morse Code. It prints the message in English and in Morse Code and also produces the real sound of Morse transmitting.

You can control the speed of the sound by inputting a value between 1 and 500. We think 1-30 is for the expert, 30-100 medium and 100-500 for the absolute beginner.

If you want to change speed then input "£" instead of the text. We have put in a little demo in lines 5-19 and hope that it's all right.

Maybe someone will try to connect the Vic to a radio transmitter and try it out "on the air". If so, we would very much like to hear about it.

Program notes:

5-19	Demo part
64-85	Reads and prints the alphabet
85-88	Asks for speed
105-150	Translates English to Morse Code
170-205	Data
225-255	Sound routine

```
0 REM****************
1 REM*MORSE  MONITOR*
2 REM*   (C) 1983   *
3 REM*  J J & B B.  *
4 REM****************
5 PRINT"J"
6 FORT=1TO5 PRINT"[illegible]" PRINT"[illegible] ICELANDIC [illegible]"
7 PRINT"[illegible]MORSE MANIA[illegible]"
10 PRINT"[illegible]"
11 FORW=1TO4 PRINT"[illegible]" NEXT
12 PRINT"[illegible]"
13 PRINT"[illegible]"
14 PRINT"[illegible]"
15 FORW=1TO4 PRINT"[illegible]" NEXT
19 FORU=1TO200 NEXT PRINT"J" FORTY=1TO130 NEXT NEXTT
25 VB=30
30 POKE36878 15
35 DIMA$(36),B$(36)
40 REM****************
45 REM READ & PRINT
50 REM THE ALPHABET
55 REM****************
64 FORX=1TO36 READA$(X) B$(X) NEXT
65 PRINT"J" FORY=1TO18 PRINTA$(Y) B$(Y) GOSUB230
67 FORT=1TOVB*2 NEXT NEXT
70 PRINT"[illegible]HIT ANY KEY[illegible]"
75 GETH$ IFH$="" THEN75
80 PRINT"J" FORY=19TO36 PRINTA$(Y) B$(Y) GOSUB230
82 FORT=1TOVB*2 NEXT NEXT PRINT"[illegible]HIT ANY KEY[illegible]"
85 GETH$ IFH$=""THEN85
86 PRINT"[illegible]EXPERT[illegible] 1-30" PRINT"[illegible]MEDIUM [illegible]30-100" PRINT"
[illegible]BEGINNERS100-"
87 PRINT"[illegible]HOW FAST (1-500)",
88 INPUTVB IFVB<1ORVB>500THEN86
90 REM****************
95 REM TRANSLATING
97 REM****************
105 PRINT "J"
107 PRINT"[illegible]'£'TO CHANGE SPEED"
110 INPUT"[illegible]TEXT" C$ IFC$="£"THEN86
115 PRINT"[illegible]------MORSE-CODE------[illegible]"
125 FORX=1TOLEN(C$)
130 D$=MID$(C$,X,1)
135 IFD$=" "THENPRINT FORT=1TO350 NEXTT NEXTX
140 FORY=1TO36
145 IFD$=A$(Y)THENGOSUB225
150 NEXTY FORT=1TO100 NEXTT NEXTX
155 GOTO 107
160 REM****************
165 REM     DATA
170 REM****************
175 DATA"A",".-","B","-...","C","-.-.","D","-.."
180 DATA"E",".","F","..-.","G","--.","H","....","I","..",
185 DATA"J",".---","K","-.-","L",".-..","M","--","N","-.","O","---"
190 DATA"P",".--.","Q","--.-","R",".-.","S","...","T","-","U","..-
","V","...-"
195 DATA"W",".--","X","-..-","Y","-.--","Z","--..","1",".----","2",
"..---"
200 DATA"3","...--","4","....-","5","....."
205 DATA"6","-....","7","--...","8","---..","9","----.","0","-----"
210 REM****************
215 REMSOUND ROUTINE
220 REM****************
225 PRINTD$ B$(Y)
230 FORZ=1TOLEN(B$(Y))
235 Z$=MID$(B$(Y),Z,1)
240 IFZ$="-"ORZ$="-"THENPOKE36876,242:FORT=1TOVB*3 NEXTT POKE
36876,0 GOTO250
245 POKE36876,242 FORT=1TOVB NEXTT POKE36876,0
250 FORI=1TOVB NEXT NEXTZ
255 RETURN
```

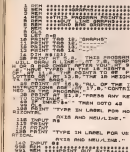
Morse
by Bjarni Birgisson

Bar graph

on ZX81

This program is written for the 16K ZX81. It will draw a line graph or a bar chart with 10 points or 10 bars in the limit 1-40 inclusive. Instructions on how to run the program are included in the program.

The program is well-structured so looking at the listing should enable you to see how it works.



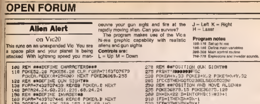
```
   1 REM ************************
   2 REM *******GRAPHS***********
   3 REM ************************
   4 REM **THIS PROGRAM PRINTS**
   5 REM ****OUT LINE GRAPHS****
   6 REM ****AND BAR GRAPHS*****
   7 REM ************************
   8 CLS
   9 LET A=0
  10 PRINT TAB 12,"GRAPHS"
  11 PRINT TAB 12,"------"
  12 PRINT TAB 13,"----"
  13 PRINT TAB 14 "--"
  14 DIM B$(21)
  20 PRINT AT 5,0,"THIS PROGRAM
 WILL DRAW A LINE",AT 7,0,"GRAP
H OR A BAR CHART AFTER YOU",AT 9
,0,"HAVE TYPED IN THE 10 HIGHTS
OF",AT 11,0,"THE POINTS TO BE P
LOTTED OR",AT 13,0,"THE 10 HEIGH
TS OF THE BARS."
  25 PRINT AT 16,0,"ALL OF THE I
NSTRUCTIONS ARE",AT 17,0,"CONTRI
NED IN THE PROGRAM."
  30 PRINT AT 21,2,"PRESS ANY KE
Y TO CONTINUE."
  40 IF INKEY$="" THEN GOTO 40
  99 CLS
 100 PRINT "TYPE IN LABEL FOR HO
RIZONTAL
             AXIS AND NEW/LINE."
 110 INPUT A$
 115 PRINT
 116 PRINT
 120 PRINT "TYPE IN LABEL FOR VE
RTICAL
             AXIS AND NEW/LINE."
 140 INPUT B$
 990 REM ************************
 991 REM ****PRINT OUT AXIS*****
 992 REM ************************
 999 CLS
1000 PRINT
1010 PRINT
1020 PRINT
1030 PRINT
1040 PRINT
1050 PRINT
1060 PRINT
1070 PRINT
1080 PRINT
1090 PRINT
1100 PRINT
1110 PRINT
1120 PRINT
1130 PRINT
1140 PRINT
1150 PRINT
1160 PRINT
1170 PRINT
1180 PRINT
1190 PRINT
1200 PRINT
1205 REM ************************
1206 REM *****LABEL AXIS********
1207 REM ************************
1210 PRINT TAB 18,A$
1220 FOR Z=0 TO 20
1230 PRINT AT Z,0,B$(Z+1)
1240 NEXT Z
1250 LET A=A+1
1260 IF A=1 THEN PRINT AT 18,4,"
PRESS ANY KEY TO CONTINUE."
1270 IF A=1 AND INKEY$="" THEN G
OTO 1270
1280 IF A=2 THEN GOTO 2000
1290 IF A=3 THEN GOTO 3500
1350 CLS
1360 PRINT AT 0,0,"DO YOU WANT A
 LINE GRAPH (1) OR",AT 2,0,"BARC
HART (2) TYPE IN",AT 4,0,"NUMBER
 OF CHOICE."
1370 IF INKEY$="1" THEN GOTO 200
0
1380 IF INKEY$="2" THEN GOTO 300
0
1390 GOTO 1370
1990 REM ************************
1991 REM **ENTER LINE GRAPH****
1992 REM *****CO-ORDINATES******
1993 REM ************************
2000 CLS
2010 PRINT "TYPE IN 2ND PART OF
CO-ORDINATE
             AND RETURN (LIMITS 1
 TO 40)"
2015 PRINT
2020 PRINT TAB 8,"1,?",
2030 INPUT Z
2034 PRINT Z
2035 PRINT
2040 PRINT TAB 8;"2,?",
2050 INPUT Y
2054 PRINT Y
2058 PRINT
2060 PRINT TAB 8,"3,?",
2070 INPUT X
2074 PRINT X
2078 PRINT
2080 PRINT TAB 8,"4,?",
2090 INPUT W
2094 PRINT W
2098 PRINT
2100 PRINT TAB 8,"5,?",
2110 INPUT V
2114 PRINT V
2118 PRINT
2120 PRINT TAB 8,"6,?",
2130 INPUT U
2134 PRINT U
2138 PRINT
2140 PRINT TAB 8,"7,?",
2150 INPUT T
2154 PRINT T
2158 PRINT
2160 PRINT TAB 8,"8,?",
2170 INPUT S
2174 PRINT S
2175 PRINT
2180 PRINT TAB 8,"9,?",
2190 INPUT R
2194 PRINT R
2195 PRINT
2196 SCROLL
2200 PRINT TAB 8,"10,?",
2205 INPUT Q
2210 PRINT Q
2211 IF Z>40 OR Z<1 THEN GOTO 22
50
2212 IF Y>40 OR Y<1 THEN GOTO 22
50
2213 IF X>40 OR X<1 THEN GOTO 22
50
2214 IF W>40 OR W<1 THEN GOTO 22
50
2215 IF V>40 OR V<1 THEN GOTO 22
50
2216 IF U>40 OR U<1 THEN GOTO 22
50
2217 IF T>40 OR T<1 THEN GOTO 22
50
2220 IF S>40 OR S<1 THEN GOTO 22
50
2219 IF R>40 OR R<1 THEN GOTO 22
50
2220 IF Q>40 OR Q<1 THEN GOTO 22
50
2240 GOTO 500
2250 CLS
2260 PRINT AT 10,0,"YOU PUT IN A
 NUMBER OUT OF THE",AT 12,0,"LIM
ITS SO YOU HAVE TO",AT 14,0,"RE-
ENTER ALL OF THEM."
2270 PAUSE 200
2280 GOTO 2000
2490 REM ************************
2491 REM *****PLOT POINTS ON****
2492 REM ******LINE GRAPH*******
2493 REM ************************
2500 PLOT 9,Z+3
2510 PLOT 15,Y+3
2520 PLOT 21,X+3
2530 PLOT 27,W+3
2540 PLOT 33,V+3
2550 PLOT 39,U+3
2560 PLOT 44,T+3
2570 PLOT 51,S+3
2580 PLOT 57,R+3
2590 PLOT 63,Q+3
2600 REM ************************
2601 REM *****JOIN UP POINTS****
2602 REM ************************
2610 LET X1=5
```

continued on page 37



```
2511 LET Y1=Z+3
2512 LET X2=16
2513 LET Y2=Y+3
2514 GOSUB 2800
2517 LET X2=21
2518 LET Y2=X+3
2519 GOSUB 2800
2522 LET X2=27
2523 LET Y2=W+3
2524 GOSUB 2800
2530 LET X2=33
2535 LET Y2=V+3
2540 GOSUB 2800
2545 LET X2=39
2550 LET Y2=U+3
2555 GOSUB 2800
2560 LET X2=44
2565 LET Y2=T+3
2570 GOSUB 2800
2575 LET X2=51
2580 LET Y2=S+3
2585 GOSUB 2800
2590 LET X2=57
2595 LET Y2=R+3
2700 GOSUB 2800
2705 LET X2=63
2710 LET Y2=Q+3
2725 GOSUB 2800
2799 GOTO 4000
2800 LET M=(Y2-Y1)/(X2-X1)
2810 LET C=Y1-M*X1
2820 FOR F=X1 TO X2
2830 PLOT F,M*F+C
2840 NEXT F
2850 LET X1=X2
2860 LET Y1=Y2
2870 RETURN
2990 REM ************************
2991 REM ****ENTER HIGHT OF*****
2992 REM ***COLUMN-BAR GRAPH****
2993 REM ************************
3000 CLS
3005 LET A=A+1
3012 PRINT "ENTER HEIGHT FOR EAC
H COLUMN"
3013 PRINT
3015 PRINT "HEIGHT OF COLUMN IS
FROM 1 TO 40"
3020 PRINT
3030 PRINT "TYPE IN HEIGHT OF 1S
T COLUMN"
3040 INPUT Z
3045 PRINT Z
3050 PRINT "TYPE IN HEIGHT OF 2N
D COLUMN"
3060 INPUT Y
3065 PRINT Y
3070 PRINT "TYPE IN HEIGHT OF 3R
D COLUMN"
3080 INPUT X
3085 PRINT X
3090 PRINT "TYPE IN HEIGHT OF 4T
H COLUMN"
3100 INPUT W
3105 PRINT W
3110 PRINT "TYPE IN HEIGHT OF 5T
H COLUMN"
3115 INPUT V
3117 PRINT V
3120 PRINT "TYPE IN HEIGHT OF 6T
H COLUMN"
3130 INPUT U
3135 PRINT U
3140 PRINT "TYPE IN HEIGHT OF 7T
H COLUMN"
3150 INPUT T
3155 PRINT T
3160 PRINT "TYPE IN HEIGHT OF 8T
H COLUMN"
3170 INPUT S
3175 PRINT S
3180 PRINT "TYPE IN HEIGHT OF 9T
H COLUMN"
3190 INPUT R
3195 PRINT R
3196 SCROLL
3200 PRINT "TYPE IN HEIGHT OF 10
TH COLUMN"
3210 INPUT Q
3213 SCROLL
3215 PRINT Q
3220 IF Z>40 OR Z<1 THEN GOTO 32
40
3221 IF Y>40 OR Y<1 THEN GOTO 32
40
3222 IF X>40 OR X<1 THEN GOTO 32
40
3223 IF W>40 OR W<1 THEN GOTO 32
40
3224 IF V>40 OR V<1 THEN GOTO 32
40
3225 IF U>40 OR U<1 THEN GOTO 32
40
3226 IF S>40 OR S<1 THEN GOTO 32
40
3227 IF T>40 OR T<1 THEN GOTO 32
40
3228 IF R>40 OR R<1 THEN GOTO 32
40
3235 IF Q>40 OR Q<1 THEN GOTO 32
40
3238 GOTO 899
3240 CLS
3241 PRINT AT 10,0,"YOU ENTERED
A NUMBER THAT IS OFF"
3244 PRINT AT 12,0,"THE SCALE SO
 YOU WILL HAVE TO"
3246 PRINT AT 14,0,"RE-ENTER ALL
 OF THEM."
3247 PAUSE 400
3248 CLS
3249 GOTO 3010
3490 REM ************************
3491 REM ****DRAW BAR-CHART*****
3492 REM ************************
3500 FOR C=4 TO 3+Z
3510 PLOT 9,C
3515 PLOT 8,C
3520 NEXT C
3530 FOR C=4 TO 3+Y
3540 PLOT 16,C
3545 PLOT 14,C
3550 NEXT C
3560 FOR C=4 TO 3+X
3570 PLOT 21,C
3575 PLOT 20,C
3580 NEXT C
3590 FOR C=4 TO 3+W
3600 PLOT 26,C
3605 PLOT 27,C
3610 NEXT C
3620 FOR C=4 TO 3+V
3630 PLOT 32,C
3635 PLOT 33,C
3640 NEXT C
3650 FOR C=4 TO 3+U
3660 PLOT 38,C
3665 PLOT 39,C
3670 NEXT C
3680 FOR C=4 TO 3+T
3690 PLOT 45,C
3695 PLOT 44,C
3700 NEXT C
3710 FOR C=4 TO 3+S
3720 PLOT 50,C
3725 PLOT 51,C
3730 NEXT C
3740 FOR C=4 TO 3+R
3750 PLOT 56,C
3755 PLOT 57,C
3760 NEXT C
3770 FOR C=4 TO 3+Q
3773 PLOT 63,C
3774 PLOT 62,C
3780 NEXT C
3790 LET S=S+1
4000 PAUSE 600
4005 CLS
4010 PRINT AT 8,1,"(1) TO START
AGAIN"
4020 PRINT AT 10,1,"(2) TO FINIS
H"
4030 PRINT AT 18,1;"ENTER NUMBER
 OF CHOICE"
4040 IF INKEY$="1" THEN GOTO 1
4050 IF INKEY$="2" THEN GOTO 500
0
4060 GOTO 4040
5000 REM ************************
5001 REM ****GOODBYE MESSAGE****
5002 REM ************************
5010 CLS
5020 FOR A=1 TO 21
5030 SCROLL
5040 PRINT TAB A,"GOODBYE"
5050 NEXT A
5060 STOP
9000 SAVE "GRAPHS"
9090 GOTO 1
```

Bar graph
by Neil Simons



Alien Alert

on Vic20

This runs on an unexpanded Vic. You are a space pilot and your planet is being attacked. With lightning speed you manoeuvre your gun sight and fire at the rapidly moving alien. Can you survive?

The program makes use of the Vic's hi-res graphic capability with realistic aliens and gun sights.

Controls are:
L = Up M = Down
J = Left K = Right
H = Laser

Program notes

100-170 Set up hi res
180-190 Define main variables
200-350 Main control routine
750-770 Explosions and invader sounds.

```
100 REM ***DEFINE CHARACTERS***
110 POKE52,28 POKE56,28 CLR FORA=7168TO7679
    POKEA,PEEK(A+25600) NEXT POKE36869,255
120 REM **DEFINE GUN SIGHT**
130 FORA=7432TO7439 READB POKEA,B NEXT
140 DATA24,24,60,231,231,60,24,24
150 REM **DEFINE INVADER**
160 FORA=7439TO7446 READB POKEA,B NEXT
170 DATA24,60,126,219,255,126,60,102
180 BU=15 REM ***SET VARIABLES, SCREEN AND
    POKES***
185 PRINT"J"
190 T=T+1 PRINT"JSCORE="SC A=7680 B=38400 X=
    142 DX=32 POKE650,128
200 REM ***CONTROL ROUTINE***
210 REM **GET CHARACTER FROM KEYBOARD**
220 C=0 REM **I=UP,M=DOWN J=LEFT/K=RIGHT**
230 C=C+1 GETA$ IFA$="I"THENX=X-22 Y=22
240 IFA$="M"THENX=X+22 Y=-22
243 POKE36875,0 POKE36874,0
245 IFT>10ORBU<1THENPRINT"JTHE ALIENS HAVE
    LANDED" PRINT"YOUR SCORE WAS"SC"WITH
    "XY"TRY'S" END
250 IFA$="J"THENX=X-1 Y=1
253 IFBU<1THEN257
255 IFA$="H"THENGOSUB700 XY=XY+1 BU=BU-1
257 PRINT"ENERGY=  BU
260 IFA$="  THEN  Y=-1
265 IFX<0ORX>506THENX=0 GOSUB600
270 REM **POSITION GUN SIGHT**
275 PRINT" SC
280 POKEA+X,33 POKEB+X,2 POKEA+X+Y,32
285 IFC<5THENGOTO230ELSEGOTO290
290 REM **POSITION AND MOVE ALIEN**
295 POKE36878,15 POKE36875,128
300 DX=DX+22 D=INT(RND(1)*3)+1
310 IFD=1THENDX=DX-1
320 IFD=3THENDX=DX+1
330 POKEA+DX,34 POKEB+DX,6 POKEA+DX-21,32 POKE
    A+DX-22,32 POKEA+DX-23,32 POKE36875,0
340 IFA+DX>8164THENGOSUB600 POKE36878,15 FORT
    =1TO3 FORG=1_3TO255 POKE36874,G NEXT NEXT
    GOTO185
350 GOTO220
600 FORE=0TO21 POKEA+E,32 POKE8164+E,32 NEXT
    RETURN
700 IFPEEK(A+X)=34ORPEEK(A+DX)=33THENSC=SC+10
    GOSUB750 BU=BU+1 GOTO190
710 RETURN
750 POKE36878,15 FORL=1TO30 FORM=_50TO240STEP-1
    POKE36874,M NEXTM FORM=240TO250
760 POKE36874,M NEXTM POKE36874,0 NEXTL POKE
    36878,0
770 RETURN
```

Alien Alert
by C Anderson

****

Adventure Competition

****

Write an adventure game and win a Commodore 64!

***Popular Computing Weekly* is offering a star prize of a Commodore 64 for the best adventure game written for *any* home micro — PLUS — a special prize of a Vic20 for the best essay on an adventure theme — PLUS — for the next 10 runners-up two Commodore adventure games.**

Each week during May *Popular Computing Weekly* will publish a coupon — simply cut out any three and send them in with your entry.

The best adventure games are ideally a combination of action and logical riddles. For instance, to open a door the player should not merely have to find the magic word but have to solve a puzzle in order to progress to the next location. Good graphics obviously enhance a program — and we'll be looking for a game that makes imaginative use of graphics, although that does not mean that a text only program will be eliminated.

Other things we will be looking for are the surprise twists that make a program worth coming back to again and again.

And remember, don't make your game too difficult in the early stages — adventuring novices should have a chance to get some way into the game before getting stuck!

For those of you submitting scenarios with your program, think of it as a guide line for a programmer. Draw a map showing location objects and other important details of your adventure and complete [illegible] of key words that your program will accept.

If you do not want to write a full blown adventure game you can still enter the competition by writing an essay (up to 2,000 words) on an original adventure theme. A Vic20 will be awarded to the essay which describes the most original and interesting adventure game.

The competition will be judged by Tony Bridge and *Popular Computing Weekly* editor Brendan Gore.

PRIZES

1. Commodore 64
2. Vic20
3. Two Commodore adventure games of your choice for 10 runners-up

HOW TO ENTER

All you have to do to enter this competition is collect the coupon from three issues of the magazine and send them together with your entry (stating which machine your game is for) to:

Popular Computing Weekly
Adventure Competition
Hobhouse Court
19 Whitcomb Street
London WC2 7HF

RULES

1. Each entry must [illegible] your adventure or essay together with three coupons, and your name and address.
2. Closing date for the Adventure Competition is 30 June 1983.
3. The judges' decision is final.
4. No employees of Sunshine Publications Ltd or their families will be eligible to enter.

Adventure Competition



Name

Address

Tel No



Source of light!

This week, I want to look at two programs from the same source Mikro-Gen

The traditionalist will appreciate *Sorcerer's Castle* The player may make the choice of becoming, for the duration, a warrior wizard elf, Hobbit and so on Several points are then dished out for strength wisdom intellect etc — the good old traditional Dungeons and Dragons Parameters

A few more points are given to the player to be distributed as he wishes Then 60 gold pieces are used to purchase weapons armour and flares or torches (and you will certainly need some source of light when play starts)

A lengthy wait follows while the floor plan of the castle is set up — a nice feature of this being the clock that counts down the seconds It's good to know that the computer hasn't packed up on you!

When the set-up is finished the player is given information of his whereabouts in the castle The castle has several levels each containing 64 rooms (a square of 8x8) A list of weapons and treasure is also available Now things really start to get interesting! It is possible of course to simply thrash about in the dark going from room to room

But the cautious, or prudent, adventurer will have provided him (or her) self with a torch or more extravagantly as they can only be used once, a flare By shining the light into the next room the player can safely examine what awaits In this way the whole matrix can be mapped out A floor plan can be called up but will only show the contents of rooms visited

Whilst travelling about various treasures and objects are discovered These are sometimes booby-trapped for the unwary A book may be a vital clue or it may blow up in the adventurer's face — or stick to the weapon hand! However there are many gems lying about for the taking

The purpose of all this weird wandering is to find the Sorcerer and beard him in his lair! He is resident in one room of the castle and many clues are presented to the searcher during the course of his wandering Whilst the books may be booby-trapped it is often worth taking the risk to open them as they may also give the location of the Sorcerer's room

Now there are several features of the game such as the method of travel between levels, and a special extra-fast way of travelling that I won't detail here — I don't want to give everything away! The program is really a blood relative of that old favourite *Wumpus* but doesn't suffer because of that If you are a renegade from *D&D*-ing looking for some of the flavour of that game *Sorcerer's Castle* is well worth a look

The second program from Mikro-Gen again for the expanded Spectrum is *Mad Martha* — a marvellous title for a marvellous adventure The whole program is really dotty and a refreshing change from some of the doom-laden programs encountered nowadays

The player is cast in the role of the poor hen-packed husband of the Martha of the title Like many of us, he has the purely unselfish and totally reasonable yearning to go and have a good night out — he reckons without his dear wife however! From the very start he has troubles as circumstances do their best to thwart him First he wakes up the baby, who starts yelling Too much noise of course, will bring "her indoors" running to see what hubby is up to

Each location is depicted in high resolution graphics and has an object to be used (at that location or some other), and a puzzle to be solved — in this game you will not get to the next stage without solving the present conundrum

So far *Mad Martha* is a very funny but otherwise straightforward adventure, but at certain points it makes a u-turn and becomes an arcade game There are several of these sections each one different — none of them will take over from *Scramble* or *Defender* but they are amusing diversions

I should say now that I haven't had the game long enough to make any significant headway (Martha keeps getting me with her chopper!) but I'm looking forward to getting my own back! If anyone has worked through the adventure would you send me (in a sealed envelope!) the solution?

Thank you for all the hints and advice you have sent in, regarding *The Hobbit* — they have all been very interesting Some of you have sent fairly detailed breakdowns of the program but I have yet to see a complete plan of the adventure If anyone would like to send me a blow-by blow description of their wanderings I would be very grateful

R W Humpleby of Hartlepool is stuck in the Goolin's Dungeon and so is Dorene Cox of Dagenham — she has had problems in many locations of *The Hobbit* But don't worry Dorene I don't think you've got a dodgy tape!

For these and any others still stuck at the Dungeon here is an encoded clue — first type in the little coding program (*Popular Computing Weekly* 5-11 May page 33) and then type in this coded message

Sorcerer's Castle

for 48K Spectrum



sthnrmaoo+rey+rcy+lla+

and then

d+hhigrisef+ulg

Let me know if you need any more help! One or two of you have mentioned little bugs in the program — one of the most serious will cause the program to hang up and refuse to respond any further If you key *Caps Shift* and then the number 1 you will have to reload the program — just beware of clumsy fingers!

Jonathan Brennan (13) of Maidenhead has sent me a few cryptic clues to inform me of his current position in what he says is undoubtedly the best adventure game ever made "Once captured, I fell for the trap and the Butler had me over a barrel From then on it was lonely on my holiday in the Lake District But I am still having trouble with William Shakespeare Can you work out where he is now?

Next some help required! Neil Stubbs of Mundesly Norfolk, and Richard Cooke of Norwich are both struggling with *Castle of Riddles* for the BBC-B They are having trouble in the corridors of doom the safe and the gallery If you have finished the game or can throw some light on the situation please let me know

Finally I'll let Peter Cusimano of Idle (an apt name maybe?) have the last word He says "I enjoy reading your articles and always turn to your pages last" I don't quite know how to take that, Peter! Anyway he says, as a final word "There's no beer on Jupiter!" — Well Peter I remember a few good nights down at the Old Red Spot! ■

[illegible]



TWO QUESTIONS

Scott McCall of Dudley Drive, Glasgow writes

Q **I am a Spectrum owner, and have so far had many happy hours on this fine computer. But I have two questions about it**

(a) Is it possible to get a proper keyboard for it with moving keys at the correct pitch, and with a space bar. I have seen several illustrations in magazines of keyboards for the ZX81, but they all seem to copy the original keyboard. Is it possible to get one which has its own key just for comma and full stop, for example.

(b) Is there any way of intercepting the *Integer out of range* error code for the *Print* and *Plot* commands? Or is there a way of using a routine that would allow for plotting to be done off the screen?

A There are several keyboards on the market but the only one that matches your needs is made by Dean. This board comes with several extra keys the functions of which depend entirely on you.

No command presents any special problems to put on a separate key. Like the ZX81 the Spectrum uses eight addresses and five data lines and these need wiring up normally. The only problem comes with shifted characters where some 'juggling' of the lines is involved to simulate the double statement. Details of how to do this plus a set of the necessary diodes are available from Stephen Adams, 1 Leswin Road, Stoke Newington, London N16.

The only way to stop the *Integer out of range* error code is to stop the *Plot* command going off the end of the screen. To do this a routine is needed that searches for the end of the screen intercepts the *Plot* command before it gets there and stops it at the last screen location.

SWITCH ON OR OFF

Simon Jones of Edmunds Road Hertford Herts writes

Q **I have a 16K Spectrum and I would like to know if I can switch on or off a relay using the edge connector and the *Out* command (or any other command). If not, would I have to buy an I/O port, or would the ZX expansion module have this facility? I know a little about electronics, so I might be able to make some adjustments to the connector.**

A You will need an I/O port for your Spectrum if you want to use a relay. I am not sure what you mean when you say the 'ZX expansion module' but I presume you mean the one that Sinclair intend to supply themselves. If so, this won't be suitable as it is designed for networking and driving a printer.

There are several commercially available ports that will do what you want. R D Labs make a motherboard that has three ports on it. Furnell Engineering and Kempston also manufacture one. If you really do have confidence in your ability to wield a soldering iron, then Stephen Adams' book *20 Electronic Projects* has plans of how to make your own.

A-LEVEL MATHS

R A Batternill of Latham Road Gosport Hants writes

Q **First of all thank you for the magazine, it is greatly appreciated. As a relative newcomer to the 'micro scene', (I own a Dragon), I am not yet able to write the programs, I need, as fast as I need them. Could you please tell me where I might find a program in mathematics up to A-Level standard for the solutions on linear and simultaneous equations.**

My thanks to G Norton for his x,y plotter, *Popular Computing Weekly*, Vol 2 No1, as it was very useful.

A I am afraid that so far I have been unable to track down any Dragon software to A Level standard at all. I think that more advanced software will slowly become available, as more people come to realise the potential of this computer.

Unfortunately, it suffers from not being one of the approved micros for use in schools. I do not think that this is any inherent fault of the machine itself rather a case that it was not in existence when the scheme started. Whether or not it will be included will depend on the government but if it is not included then I think that will slow the development of such software. I do not know if any reader has a program for what you want but if anyone does please send it in.

WHAT'S THE ADDRESS?

Gary Hardwicke of Bracken Brough, Brixworth, Northampton writes

Q **I have had a Vic20 now for about six months and I would very much like to know how to use the user port.**

I was told by a friend that numbers could be *Poked* into it to change it to binary. If there was one in the bit a current was sent, and if there was a nought then no current was sent.

If this is true, how do I go about setting up my Vic to control lights and so forth? Will I need a control box, or will ordinary switches do?

Also, what is the address of the user port? Is there any hardware that will help me or any good books that will give me more information?

A The plans of the user ports and the various allocations of the individual pins is a much more involved problem than I am able to cover here. The *Input* and *Output* from a port is always in binary. A current is either present or not. In the same way, the numbers you *Poke* into the port or anywhere else, are translated into binary for the computer to understand.

There are two books that you should look at. One is Nick Hampshire's book *Vic Revealed*. This contains the mapping and allocation for all the Vic ports. The other is Stephen Adams' book *20 Electronic Projects for the ZX81 and Other Computers*. It is currently being revised to include more information about the mapping for a variety of projects. When you have worked out enough to make use of the ports possible, Stephen Adams' book will supply some interesting projects to try.

UNUSUAL FEATURE!

B Steen of Spicer Lane, Bear Cross, Bournemouth, Dorset, writes

Q **I recently bought Psion's *Flight Simulation* program for my ZX81, which I would recommend to anyone. It has the unusual feature of being able to check to see if it has loaded itself with *Load check* followed by either *Passed* or *Failed*.**

I was most surprised to find that this program was recorded onto only one side of the tape, as I decided to make a safety copy. Although the program was copied satisfactorily it stopped at the line

```
IF USR (102 * PEEK 16400 + 256 * PEEK 16401) = 0 THEN RUN
```

If I give the command Run it does — but I have lost the *Load check* facility. Can you tell me how to get it back?

A This I can only assume is software protection in action as I do not know how the line works and neither can I remember seeing a similar line in other programs. It would seem as though some sort of specific variable has to be defined and it cannot be defined if the *Save* command is used.

From Psion's point of view I am sure that you can appreciate their desire to protect their product. I can offer no suggestions — I did not contact Psion as I think they would be justified in not giving me an answer.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.



CLASSIFIED

Semi-display — £5 per single cc
Trade lineage — 20p per word
Private lineage — 10p per word

CALL *DIANE DAVIS* ON *01-839 2476* FOR SEMI-DISPLAY ADVERTISING

GAMES SOFTWARE

ORIC 1 (48K) SOFTWARE Hangman Hi res 3D Graphics 700+ vocabulary Sea Patrol Defend Britain in Wartime! Demon Driver Become World Champion! 1—£3 50 2—£5 00 3—£5 85 cheques/POs to N Pagat 12 Heol Croesty Pencoed Mid Glamorgan CF35 5LR

SPECTRUM Krazy Kong £3.50 0708 40948

CBM64 QUALITY SOFTWARE. Patience £6 Fontoon £5 Maze 64 £6, Adventure (joystick) Haunted Castle £6 C P White (Services) 76 Uxbridge Road Hanwell London W7 3SU Trade welcome

SPECTRUM 16/48K. Amazin games from Alpha Systems! 10 great Arcade games for the price of one! Breakout Gobbler Bomber Death Squad Slalom Swarm and more! All for only £4 50 (inc p&p) Fast delivery Alpha Systems Control 2 Busbiehead Cottage Kilmaurs Kilmarnock

19K JUPITER ACE
KRAZY KONG
4 sheets of fast amazing graphics with parasols mallets little barrels Kong and a man running up the ladders and girders to rescue his girl!
£5 on cassette from
J JONES 5 Turnham Green
Penylan, Cardiff CF3 7DL

COMMODORE 64 Grand Prix cassette High speed racing game with sound oilslicks machine code three screens six skill levels, etc Send £5 to Nigel Latimer 57 Bargate Grimsby South Humberside

TI99/4A GOLD DIGGER Secret Agent Password Risk Full graphics and sound P & P free £3 each or any two for £4 A Hetherington 17 Catalina Gardens Newtownards Co Down BT23 4RT

ACE SOFTWARE. 7 games for the unexpanded Jupiter Ace only £4 Federation Software 58 Rawley Crescent New Duston Northampton

ZX81 MONOPOLY 16K
VERY ADDICTIVE
play for hours against your computer
Fast delivery
ONLY £5 inc.
Cheques POs payable to
M.P.T. 42 Reedwald Drive
Bury St. Edmunds, Suffolk

FOUR CLASSIC ARCADE GAMES for the BBC Model B (Invaders Maze etc) only £7 50 inc Ganymede Systems Limited Huntsmans Walk Rugeley Staffs Tel 08894-78333 (Access) Trade enquiries welcome

PALACE SOFTWARE

GAMES PROGRAMMERS
Palace software, a part of a leading film and video company, is looking for games for Atari 400 800 BBC Model B TI99 4A Spectrum VIC 20 and CBM 64 for distribution in the UK Europe and USA High royalties will be paid for top quality and highly original material Send samples to
Pete Stone Palace Software 62 64 Kensington High Street London W8 (Tel 01 937 6258)

SPECTRUM 12 GAMES TAPE £4 Pacman Hangman Tron Centipede Pontoon Bomber Tunes, Logo etc Also Space Tape £3 Defender Tron 2, Star War Star Trek, Invaders etc J Leash 8 Cottesford Close Hadleigh Suffolk, or Tel 0473 822284 (after 6 pm)

LYNX 48K SOFTWARE
Labyrinth — 3D Maze Game
Othello — our version of popular board game in fast machine code
Chancellor — run the UK economy for 10 years
£4 75 each inc. p&p Cheques/P O to
QUAZAR COMPUTING DEPT PCW
17 TREE CLOSE PORTSLADE SUSSEX

ESTUARY E.S.P. 42 SOFTWARE — NOW AVAILABLE — Sinclair

HITCH-HIKERS
GUIDE TO THE
GALAXY
For 48K Spectrum £9 95
Also for Apple 2 £19 95
LARGE RANGE OF SOFTWARE ON DISPLAY AT OUR SHOP

DRAGON POP QUIZ over 460 titles are contained in the program Can you match them up with the correct artist? Bargain £2 50 (inc P & P) 8 Faraday Street Holderness Road Hull

TI-99/4A. Arcade Action Grand Prix for unexpanded machine £3 95 Unexpanded TI-99 4A programs wanted for 30% royalties Send on cassette Cheques/POs to Microsonic (PCW) 85 Malmesbury Road Cheadle Hulme Cheshire SK8 7QL.

***BBC* 'B' — TOP GAMES**
SUPERGOLF £7 50
BUNFUN £6 50
OR ORDER BOTH £13
CHEQUES POs TO
SQUIRREL SOFTWARE
DEPT (3) 4 BINDLOSS AVENUE
ECCLES MANCHESTER M30 0DY

C.P. DATA SYSTEMS
DRAGON 32
Enchanted Garden
(padded cell extra) £4 95
Alien Attack £2 95
Both games post FREE from
4 MARSTON ROAD THAME OXON

SWAN-TRAP BBC MODEL (B) The ultimate surround game Movement in any direction continuous background music in two-part harmony optional obstacles Invisible explosive eggs £4 50 Peter Donn 33 Little Gaynes Lane Upminster Essex RM14 2JR

COSMOS
COMPUTER SOFTWARE
the ORIC-1
HOPFROG—CITY BOMBER
best machine code for best screen graphics
Full colour and sound
only £4 95
THE SORCERER (B.P.)
very fun high-quality games with added originals from COSMOS MISSION 68 APPLES TRON LANDER + more
only £4.95
Send cheque/PO to
COSMOS COMPUTER SOFTWARE
85 WOOD CRESCENT
MOTHERWELL, LANARKSHIRE
MU 1NW

48K SPECTRUM DARTS Five different games on dboard scoring with options Play computer or opponent(s) R Kerr 53 Kevockvale Park Lasswade Midlothian Scotland

YATZEE!! The popular dice game for any Spectrum Up to six players £3 50 from M Dolphin 8 The Handbridge Highgate Park, Fulwood Preston Lancashire

SPECTRUM 16K or 48K Squash game and 3D bar graphs to your design up to 16 columns save graphs on tape can superimpose two graphs for £2 95 Cheques to M Dennis, The Elms, Hundleby Spilsby PE23 5LZ

CHRISTINE COMPUTING
T99 4A SOFTWARE
NORTH SEA, CODE BREAK
ASTRO-FIGHTER
£3.50 each £6.00 for two
£9 for all three
SAE for Hardware/Software Catalogue to
Dept PCWK 6 Florence Close, Watford Herts.

CLASSIFIED ADVERTISING RATES:

Line by line: For private individuals 10p per word, minimum 10 words
For companies traders and all commercial bodies 20p per word minimum 20 words.

Semi-display £5 per single column centimetre minimum length 2 cm (Please supply A/W as PMT Or supply rough setting instructions)

Conditions All copy for Classified section must be pre-paid Cheques and postal orders should arrive at least two weeks before the publication date

If you wish to discuss your ad please ring Diane Davis 01-839 2476

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

		Please continue on a separate sheet of paper	

I make this .... words at .... per word so I owe you £ ....

Name ....

Address ....

....

Telephone ....

Please cut out and send this form to Classified Department *Popular Computing Weekly* Hobhouse Court 19 Whitcomb Street London WC2

EDUCATIONAL SOFTWARE

CRUISE CRUISE Here comes Cruise Cruise Missile trajectory simulated with ZX81/Spectrum graphics Program printout free with following publications for ZX81 Spectrum (1) Satellite Spotter program prints positions of communication satellites launched by different countries Graphic displays (16K Ram) Price £8 + Hard copy (2) Mathematical Programs with Graphics plots lines circles numerical integration Computes determinants maxima series mortgages Price £8 + Hard copy Cash with order only Stusen 24 Elm Close Bedford Beds MK41 8BZ

CAN YOU WRITE EDUCATIONAL programs for use by teachers on the BBC model B? If you think your standard is high enough and want to know more about our royalties send example program on cassette to Micro Concept 22 Allenby Avenue Grimsby Humberside

DRAGON
USERS

Don't just play games use your brains with our

EDUCATIONAL SOFTWARE

only **£4.95** each

Physics (O level) **Biology** (O level)
Ballet (CSE) **Spelling** (5/99 yrs)
Tables (7-11 yrs) **Arithmetic** (7-11 yrs)
General Knowledge (9-99 yrs)

Fun to use with full colour and sound
Only **£4.95** each on cassette
Cheque/PO to

MICRO-DE-BUG CONSULTANCY
60 Sir John's Road Selly Park
Birmingham B29 7ER

PRE-SCHOOL/EARLY SCHOOL CASSETTE. suitable schools/home Seven educational stimulating programs for children 4-44 years Written by teachers 16/48K Spectrum £6 cheque/PO to Essex Software Dept W 16 Huntsmans Drive Upminster Essex.

PASS FRENCH 'O' LEVEL. 50 verbs in five tenses for 48K Spectrum Random selective testing or listing of verb in chosen tense £3.95 W Thies 25 Primula Drive Norwich NR4 7LZ

UTILITIES

SPECTRUM 48K COPYTAPE
The first complete Copier system for the Spectrum

STILL THE BEST
NOW THE CHEAPEST

Copies all Spectrum file tapes (up to 80K) plus Headerless files And displays full file details and easy to use (Menu driven)

£3.95

N. G. Bradirk 25 Dales Drive Wimborne, Dorset

NB Users must not infringe copyright

McSAVE FOR DRAGON How to copy machine code programs Information sheet from Hobie Software 12 Larkspur Drive Eastbourne Sussex. Price £2

NEWBRAIN FULL DISASSEMBLER Save course uncovering Rom mysteries and useful routines Hexdecimal display allows screen scrolling annotation and dumping to peripherals £4.50 from C Dixon 57 Marine Parade Brighton

007 SPY Lets you stop and copy any previously unstoppable Spectrum cassette On cassette £2.95 Bebker 25 Chadderton Drive Unsworth Bury Lancs

Spectrum Owners
First of all you had to back up programs by making tape-to-tape copies Now KEYSOFT present

THE KEY

100% machine code! Copies any type of program Order THE KEY for any ZX Spectrum Only £5.95
KEYSOFT Dept PCWk
6 Bruce Grove London N17 6RA
NB KEYSOFT advise users not to infringe the Copyright Acts

DRAGON 32 and Tandy colour Copycat This program copies machine code programs £3 and sae for listing to Richard Hunter 1 Great Park Close Southwell Nottinghamshire

SPECTRUM SPY Reads header of any program prints details of start line how to save etc Send £1.70 to O Murphy 11 Coneymead Stalybridge Cheshire SK15 1HF

SPECTRUM DECODER prints start address length of any m c Basic tape listing information 70p J Grain 'Wychwood' School Road Finstock Oxford

SPECTRUM "SNIFFER" reads tapes and prints out program name length in bytes and start address Machine Code and Basic! Also gives auto run line number £2.50 from AWA 50 Dundonald Road Didsbury Manchester

SPECTRUM KOPYKAT £4.95
100% machine-code Enables almost any Spectrum program or data file to be backed up on to a fresh tape
Programs over 41K (8.5K for 16K models) can now be copied with ease
Plus FREE Tape Header Reader program
Both programs on one cassette only £4.95
IMMEDIATE DESPATCH Send cheque/PO to
MEDSOFT 61 Aldeen Road DONCASTER DN2 5PR
IT CAN EVEN COPY ITSELF

ADAM ADAPTORS eliminate expansion problems on the ZX Spectrum (16K) ADAM I allows use of 16K/64K Ram pack ADAM II allows use of 16K Ram pack PLUS memory mapped banked (use Eprom etc) up to 16K Works with interface, printer etc on ALL models Plugs in between Ram pack and Spectrum NO unfitting or going into the case ONLY £9 including VAT and postage
STEPHEN ADAMS 1 LESWIK ROAD LONDON N16

TAPER a cheap but very effective tape copier for the 16/48K Spectrum hex dump £1.20 tape £1.90 Full details included R Thomas 9 The Copse Lindfield Sussex

SPECTRUM PROGRAM COPIER Make backup copies of protected programs (for personal use only) Full details and program listing — basic and machine £1 + SAE Ball 190 Slag Lane Lowton Warrington

TELETEX ON YOUR SPECTRUM ZX user lets you create your own personal Netlext system Similar to Ceefax and Oracle Capacity 900 pages Full colour graphics flashing inverse video 24-hour clock with alarm even the engineering test pages — it's all here! Cassette £4.95 complete with sample system Full instructions and 12 month guarantee Send cheque/PO (or SAE for details) to Ian Stewart 17 Torry Drive Alva, Scotland FK12 5NQ

TAPE COPIER for the professional — makes multiple copies of all Spectrum (16K 48K) programs (Basic M Code-Data) Easy to use MB Guar £4.95 L Evans 16 Stonepit Drive Cottingham Market Harborough Leics

HARDWARE

EPROM SERVICES
ZX HARD and SOFTWARE

ZX81	
8K Eprom Board & Eprom 1 or 2	£29.00
Eprom 1 80 routine toolkit	£10.00
Eprom 2 Rapid load/save	£16.00
Eprom 4 20 routine m/c monitor	£10.00
Eprom 5 Z80 disassembler	£16.00
Motherboard — 3 slot	£16.00
Graphics board inc 4K of Eprom	£24.00
SPECTRUM	
Eprom board	£16.00
16K Ram Pack adapter	£8.00
Motherboard — 2 slot	£16.00
I/O board (Spectrum or ZX81)	£16.00
Audio board (Spectrum or ZX81)	£21.00

Many other ZX products available SAE for list
EPROM SERVICES 3 Wedgmead Drive Leeds LS8 1EF (0532) 667183

NYLON DUST COVERS for micros and peripherals Apple II/IIe £4.95 (with two disk drives £5.95) Atari Vic20 Dragon £2.90 Epson MX80 printer £3.95 Pecer Tiger 445 00 £4.95 12in monitor £5.50 (state make) Enquiries orders to CSM Enterprises, 10 Queensgate Chorley Lancashire PR7 2PX Tel Chorley 72703

★ LYNX MUSIC MASTER ★
Now LYNX music is easy! Full net-octave stave on screen compose copy replay change tempo etc Cassette and full instructions £4.95
ALBASOFT 169 Terregles Avenue Glasgow G41 4RR

DUST COVERS available for any computer printer etc BBC TI Epson £3.95 Dragon Atari Vic20 £2.95 Sharp MZ80AK £4.95 For others please phone or write to Sherborne Designs, Victory House 8A The Rank, North Bradley Trowbridge Wilts Tel 02214 4425 Also made to measure service Dealer enquiries welcome. Access and Barclaycard

VIC20 OWNERS
DON'T BE ROBBED
Make your Vic20 guard you and your property while you are away
A 16 line Interface Kit each one fully programmable and independent of the other 15
Many other uses Software examples provided with kit £19.90 inc VAT P&P
Cheques etc to Cleveland Interface 14 Chelmsford Avenue Fairfield Stockton Co Cleveland

SPECTRUM 48K UPGRADE only £18 inc p&p Send cheque PO to N M C Computers, 1 Downing Point Dalgety Bay Fife Scotland KY11 5YT Issue 2 only

COMPUTER COMPATIBLE CASSETTE RECORDERS
AC/DC tape counter, guard and din sockets £19.95 inclusive of VAT and p&p Cheques/POs to Jay-Dee Communications 182a Water Street Port Talbot S Wales

BRAND NEW COMMODORE 64s Cost £345 my price £295 including VAT and postage and packing (save £50) You can't buy cheaper! Send cheques to R Bhattacharya 3 Wensley Close Harpenden Herts AL5 1RZ (or SAE for details)

CLUBS

SWAP UNWANTED SOFTWARE through our exchange club. **FREE MEMBERSHIP** Send SAE for details A + P (Software) Services (PCW) 142 Broadstone Way Bradford Yorkshire

PROGRAMMERS Keep your software copyright and still earn real money Join our marketing and advertising club Send tapes and enquiries to Loophole Software Arkwright House Alexandra Road Llandrindod Wells Powys

SPECIAL OFFER to Spectrum owners Save money by joining our fantastic software club We offer a wide selection of software (all originals) and books free of charge Simply return your order within 28 days and all you pay is the postage It's not good to be true Don't miss this opportunity Send SAE now for list plus details to Microsoft 103 Minstead Road Erdington Birmingham

DEALERS

COMMODORE 64 + Vic20
SOFTWARE AND HARDWARE FROM
NOLANSCO ELECTRONICS
Large selection of cassettes and cartridges available including Forth Grid runner Educational programs etc
Phone Karen
Giggleswade (0767) 316762

EAST LONDON
WIDE RANGE OF SOFTWARE FOR SINCLAIR VIC20 TRS 80 AND OTHER MACHINES
M FOREMAN
79 Mitcham road London E6 3LT
Tel 01-471 7040

COMPUTERS COMPUTERS COMPUTERS
Send for our special prices on ORIC 1 (new Ram) Vic20 Atari 400-800 and Commodore 64 They are too good to miss! Plus numerous add-ons and peripherals and vast selection of software software for the above + ZX81 Spectrum and Dragon
Why wait some more! For a catalogue
DM SOFTWARE FREEPOST (no stamp required) Rotherham S60 9BB or Tel (0709) 830549 anytime with your requirements or for a catalogue.

A RETAILER for Sinclair accessories in the north of England We are stocked near the M1 and M62 motorways. As well as a complete range of hard and software, our service department can repair moving or fit a wide range of accessories Hours of business 10 am — 8 pm Tuesday to Saturday inclusive

TELEPHONE PHILIP COPLEY ON 0924 272545
6 WESTLEY ST OSSETT, W YORKS

PLEASE RING FOR DETAILS OF OUR MAIL ORDER SERVICE

ZX81 High Res Graphics Unit
£32 (excl VAT)
Tel William Haynes 01 969 8819
Tools for Living
Notting Dale Technology Centre
191 Freston Road London W10 6TH
Cheque/PO (add 15% VAT)
plus 75p p & p



COMMODORE 64
£264.00 (excl VAT)
64 Programmers Ref Manual £15.95
+ £16.95 p&p
Tel Chris Gurney, Dave Walsh or Floyd Paterson
Tel 01-969 4658 or send SAE
Image Science Micro Computers Ltd
159 Fraston Rd London W10 6TH
or cheques P P (and 15% VAT) and £8 for p&p Securicor delivery
Prestel Frame 6128080 tel for latest software and hardware information and prices

DRAGON SALES AND SERVICE
West Devon Electronics
15 Station Road
Horrabridge Devon
Tel. Yelverton (0822) 853434
Fast reliable service. Open some evenings. All repairs carried out in our own workshop

ENFIELD COMMUNICATIONS
VIC20/64 ZX81 SPECTRUM BBC DRAGON
GAMES EDUCATIONAL BUSINESS
Full range of software and accessories MPF II 64K colour and sound £260 inc VAT
Send SAE for full list
ENFIELD COMMUNICATIONS
135 HIGH STREET
PONDERS END ENFIELD
MIDDLESEX Tel [illegible] 7636

BOOKS

MEDICAL SOFTWARE BOOKS Microcomputer Programs in Medicine £55 Introduction Computers In Medicine £10 Clinical Laboratory Micro processing £20 Enlander 328 Main Street Center Moriches NY 11934

MAGAZINES

DRAGON 32 or TANDY TRS-80 Colour? Lots of programs — lots of useful hints and information EVERY single month in RAINBOW an exciting new 200-page magazine from USA. Send £2.25 plus large 57p s.a.e for sample issue to ELKAN ELECTRONICS (Dept PCW) FREEPOST 11 Bury New Road Prestwich Manchester M25 6LZ or telephone 061-798 7613 (24-hour service)

Color Computer

FOR ALL DRAGON 32 AND TANDY LOR USERS. Brand new glossy full-colour magazine from USA — first class high quality programs and articles from top writers
★ With free UK supplement for Dragon 32 users and free advisory service ★
Send £2.25 (plus 57p sae) for sample copy
ALSO AVAILABLE FROM ELKAN ELECTRONICS
Colour Computer News
Rainbow
★ FREE BOOK with two annual subscriptions ★
ELKAN ELECTRONICS, FREEPOST
11 Bury New Road Prestwich Manchester M25 6LZ or phone 061-798 7613 (24-hours)

FOR HIRE

HIRE A COMPUTER £1.25 per week, £45 deposit for ZX81 B.S.C. 292 Caledonian Road London N1 1BA Tel 01-607 0157

COURSES

CALEDONIAN computer consultants provide programming consultancy and training courses in Basic held regularly for beginners upwards 292 Caledonian Road London N1 1BA. Tel 01 607 0157

COMPUTER HOLIDAYS
Winchester
Computer Holidays, 43 Byron Ave., Winchester S022 5AT

ACCESSORIES

CASSETTE LABELS PRINTED self adhesive any amount. See samples Six Jays Swanpool Falmouth Cornwall

DISKS. Continuous labels etc. at discount prices. Call for lists Amersham (02403) 7210 Luton (0582) [illegible]15

SERVICES

REQUIRE A PRINTER LISTING FOR YOUR VIC20 PROGRAM Send your program on tape and I will return with listing £1.60 + 60p per additional listings. Cheques postal order to S. Fensome 73 Blackfriars Rushden Northants. All tapes will be returned by recorded delivery

SOFTWARE

VIC20 SOFTWARE
All the Imagine Software Cassettes including Arcadia Whacky Waiters Catcha Snatch. All for either the expanded or unexpanded computer at only £5.00 each!!
(inclusive of postage and packing)
Send cheques POs to
RULE COMPUTERS
30 TYLERS ACRE ROAD
CORSTORPHINE,
EDINBURGH EH12 7HZ
(Tel 031-334 7261)

SPECTRUM hi PRINT amazing software that gives 64 characters per line instead of 32, prints anything from your Basic program cassette 48K or 16K £4.60 K Ahmed 28 Magpie Hall Lane, Bromley Kent.

HEBREW — עברית for 16/48K Spectrum
Complete Hebrew Input Output system allows input from any point on the screen. Fast display of Hebrew text with vowels (in mc)
Only £7.50
HEBREW HANGMAN GAME
Only £5.75
NYB SOFTWARE (Dept P)
23a St Andrews Road
London NW11 0PH

DRAGON SOUND SYNTHESIZER Disappointed with the Dragon's sound? The machine code and Basic program allows you to invent your own fantastic sound effects, eg laser siren. Once created the effects can be used in your own programs. Easy to use. Requires joystick. On cassette £3.95 C Woods, 37 Marist Lane Sutton Coldfield West Midlands B75 5PH

SPECTRUM Nine unusual programs. Guarantee and money making opportunity £4 (instructions only sae) Spectrum Kempston/Epson interface £21 RTL Westowan Porthtowan Truro

MUSIC AT YOUR FINGERTIPS
PLAYER TRANSFORMS YOUR *UNEXPANDED* VIC20
INTO A MUSICAL KEYBOARD
PLAY COMPOSE — RECORD — REPLAY
Choice of TEMPO VOLUME Octaves of TONE options. Truly original software for only £4.50 (inc). Send cheque PO to SYNCHRO SOFT 57 Belsize Drive Belmont Durham DH1 1RF

SOFTWARE LIBRARIES

ATARI VCS 400/800 OWNERS
Why not join our extensive library and hire the latest games at the cheapest rates (totals much as owned)? For details send SAE to Southern Command Software Library 72a Quarry Road Hastings Sussex TN34 3RD
Tapes stocked with permission of publisher

THE NATIONAL ASSOCIATION OF VIC20 OWNERS
★ SOFTWARE LIBRARY
★ MONTHLY NEWSLETTER
★ SOFTWARE EXCHANGE
★ ADVICE and INFORMATION
SAE FOR DETAILS
THE N A V O
21 CHACELEY WAY
SILVERDALE,
NOTTINGHAM

FOR SALE

48K SPECTRUM + ZX printer + £220 worth of the best software. Everything excellent condition. Total package worth £400 (also seven rolls of printer paper). Will accept £230 ono. Tel (0444) 206224 (after 6 pm)

ZX81 16K OK Tronics keyboard graphic Rom u d g. Q-save over £150 of software including black crystal recorder £145 ono. Telephone 01 366 7263

ZX81, 16K software manual leads, cost £100. Swap for £100 plus worth of original Spectrum software. Mr Pujara, Cavendish Hall Beckett Park Leeds

FOR SALE Vic20 super expander £20 Super Lander £14 Tel 0481 27469

TEXAS TI99/4A perfect condition with cassette leads £130 Southampton 769153

ZX SPECTRUM 16K still in box complete £90 Phone 7363547

TRS 80 Model I Level II 16K, cassette deck tapes including editor assembler and manuals. £160 Tel 0633 884385

EXCHANGE/SELL BBC B programs including Database W/Processor Banbrek, Galaxian Centipede Dragon Rider Apollo others. Write Hoe 46 Grosvenor Road Skegness Lincs

VIC20 + 8K + cassette deck 2 Rom cartridges + books (no user manual) + magazines + games cassette £198 ono Tel 0204 71438 after 6 pm

ATARI 400 16K program recorder basic assembler joysticks manuals books perfect condition £220 Tel Letchworth 70331

COMMODORE PET 2001, 32K with Epson TX80 printer and Commodore cassette drive £475 working system barely used plus books programs offers Tel Howard 01 353 1545

DRAGON 32, boxed joysticks dust cover £50 software dozens of listings tape £160 Tel 01-254 1221 evenings

FOR SALE Dragon 32 good condition £80 worth of software £160 Tel Martin Stoney 01 500 2369

ACORN ATOM 12K Ram 12K Rom books cassettes £100 Tel 01-586 0092

DRAGON 32 Starship Chameleon cartridge for sale £12 Tel 061 764 4816

VIC20, 16K cassette deck + joystick, books eight months guarantee + loads of software including Krazy Kong and Defender £200 Tel Tilbury 77329

ZX81 1K, plus tapes £25 ono Tel 021 705 5815

JUPITER ACE FOR SALE £65 Tel Chesterfield (0246) 70730 after 6 pm

48K SHARP MZ80K in unmarked condition with many software tapes, still under warranty £275 ono. Tel (0296) 880851 (evenings) or (0296) 4121 ext 384 (office hours)

DRAGON 32K tape recorder software leads manuals £160 Tel 01 876 0795

VIC20 16K Ram C2N cassette fully boxed including £175 worth of software joystick magazines £250 complete Telephone Cheltenham 28021

VIC20 3K, 8K, 16K ZX printer and interface £150 of software including Anirog Imagine and Bug-Byte Books and magazines will sell £300 ono Tel (Epping) 849 2458

SHARP MZ80K 48K, Basic tape and manual £250 Tel 01-803 8759

WANTED

WANTED, BBC (B) computer £300 J Campbell 10 McPherson Street, Bellshill Strathclyde

WANTED used Dragon joysticks cash waiting Telephone Lincoln (0522) 751271

WE ARE currently looking for original preferably debugged games and utility programs. Anything from 2K to 24K is acceptable. If you have any programs that fit those criteria write to Bamby Software Leverburgh, Isle of Harris PA83 3TX

WANTED
USED AND BROKEN ZX81s
£8 paid for your non working 1K ZX81 (£10 if you include PSU manual and leads) £20 paid for working ZX81s £10 paid for working 16K Rampacks
Send to Telford Electronics 26A Bradford Street Shifnal Shropshire
Tel (Shifnal) 46068

NEW COMPANY seeks quality software for Spectrum BBC microcomputers to market and distribute on a nationwide basis. Very high returns possible. Send tapes for evaluation to Loophole Software Arkwright House Alexandra Road Llandrindod Wells Powys

ZX81 New owner wants to buy your unwanted software. Interested? Phone Rainham (Essex) 22850 after 6.30 pm or weekends

DRAGON USER wishes to swap Microdeal light pen and games for other software. Phone John after 5 pm on Upminster 21639



Computer Swap 01-930 3266

Free readers entries to buy or sell a computer
Ring 01-930 3266 and give us the details

Spectrums for sale

SPECTRUM 48K, boxed as new with printer approximately £50 of software selling £100 Tel 500 0375
SINCLAIR ZX SPECTRUM 16K + software tape recorder £60 ono Tel Battle 2717
GAMES including Hobbit Penetrator Orbiter Arcadia Scuzolde etc £15 if buy all will give pen watch free Tel 061 881 3651 (Tony)
SPECTRUM 48K, 2 months old all leads and manual 8 software cassettes (Hobbit Timegate etc) 2 computer books ZX printer Kemp joystick Cheetah Sweet speech synthesiser £250 ono will swap for BBC A and pay difference Tel Bridgend 0656 55639
SPECTRUM 16K boxed all leads etc manual over £50 of software and books £100 ono Tel Milton Keynes 311824 office hours Mr Amos 311687
48K SPECTRUM software including Hobbit P mania plus books and magazines cost £240 will accept £180 Tel 041-427 1460
48K SPECTRUM 1 month old over £300 software including Hobbit and Penetrator £350 ono printer in need of repair £15 quick sale Tel 01-731 0800 (after 7 pm)
16K SPECTRUM £20 software quick sale £80 ono Tel 01-301 0186
SPECTRUM 16K boxed 5 months old + Ferguson cassette player software and magazines £100 Tel Chelmsford 400642
SPECTRUM 32K RAM unused issue 5 £32 Tel 0926 641040 (after 6 pm)

ZX81s for sale

ZX81 and Memotek 16K with Zonx 81 sound unit, tapes all leads and instruction manual £60 Tel St Ives 68350
32K ZX81, Memotek Ram small selection of software all as new cost £90 sell for £70 ono Tel 021 550 5879 (West Midland)
ZX81 plus 18 1K programs good condition £30 Tel Sunderland 483646
ZX81 still under guarantee 16K Sinclair expansion pack 2 tapes (1 16K and 1 1K) £70 Tel Harlow 0279 28809
ZX81 16K leads and manuals File 80 keyboard also of good games £48 Tel Sheffield 668640
ZX81 16K, 1 month old fully boxed £35 of games £75 Tel Chorley 76339
ZX81 16K, DK Tronics keyboard 4K graphic Rom Q Save tape recorder 10 master cassettes 1 book + magazines £145 Tel 01 363 6231
16K ZX81 + DK Tronics keyboard + motherboard £100 software including leadsman Scramble + machine code book £120 Tel 01 722 7425 after 6 pm
16K ZX81 with Hampson Kiik keyboard + keyboard bleeper new ZX printer all in fitted carrying case Also cassette player 4 rolls of printer paper learning kit books magazines and programs complete ZX package £150 Tel 061 766 7548
ZX81 + **16K RAM** + manuals + leads £40 Tel 051 924 3713
ZX81 + **16K RAM** ordk 2 leads £30 ono Tel 01-370 4820
16K ZX81 + £60 of games and Basic manual + all leads for £85 ono Tel Horley 3013
16K ZX81, power pack leads keyboard manuals, books £50 Tel Mirfield 5887
16K ZX81 3 tapes good condition £65 Tel Cambridge 871534
ZX81 16K RAM printer Maplins keyboard DK Tronics graphics Rom £70 software £165 ono Tel Jonathan Fleet 02514 4528
ZX81 + Memotec 16K RP software still under guarantee excellent condition £60 ono Tel 061-932 1236
ZX81 1K 2 months old excellent condition including leads power supply etc cassettes magazines £40 Tel 0604 405809 (after 5 pm)
ZX81 16K, 7 months guarantee software fully boxed £65 Tel Enfield 360 0956
16K ZX81 including DK Tronics keyboard + graphics Rom all leads + manuals included £100 software including Galaxians Space Invaders etc £110 ono Tel Stanmore 2622

Dragons for sale

DRAGON 32 + joysticks software boxed and fully guaranteed abs than 4 months old unwanted gift £190 ono Tel 03574 325
DRAGON 32 + tape recorder both guaranteed + box + joysticks, 1 cartridge 5 cassettes leads + manual £190 Tel Porthcawl 6472
DRAGON 32 + joysticks 2 cartridges books tape leads £210 ono Tel 01 904 4040

Tandys for sale

TRS80 plus interface and over 50 programs good condition £50 Tel Sunderland 483646
TRS80 MODEL 1 Level 2 monitor cassette recorder etc 01-407 2867
TRS80 MODEL 1 16K RS 232 lower case + monitor £200 (Can be seen Wimbledon or Elephant and Castle) Tel 01 946 5778 evenings
TRS80 MODEL 1 48K disc drive green screen monitor assembler compiler books + software £400 Tel 0417 474060
VIDEO GENIE EG3003 with manuals + box + £150 of software £180 Tel 01 950 3158

Commodores for sale

VIC20 cartridge for sale Tel 08956 36564
VIC20 + cassette unit + 16K + 3K expansion unit well over £1 000 software, including 2 game cartridges joystick loads of games + books + magazines value £1 350 Must sell quickly for only £450!!! ono Tel Ruislip (08956) 36564
VIC20 16K memory expander cassette recorder joystick introduction to basic 2 Rom cartridges + selection of software £280 ono Tel 01 317 0999
VIC20 games cassette including Night Crawler Amok Alien Blitz Blitz Space Freaks Cosmiads Vicmen Scrambel £22 the lot Tel Stafford 663116
COMMODORE Vic20 + cassette drive software + introduction to basic part 1 £130 Tel 01 380 6550
VIC20 + cassette unit, super expander joystick + £60 software £150 Tel Hilton Norton 737224
VIC20 Robin Carrier menu planner £5 Sub space Striker £3 50 Vic Revealed £5 Tel Newport (Isle of Wight) 526737
VIC20 + **CASSETTE UNIT** + 16K and 3K expansion unit + joystick + well over £1 000 of software consisting of 95 per cent cassette based software (mainly games) + 5 per cent books and magazines etc Also 2 games cartridges all in good condition value a half of a lot price for far less £450 Tel Ruislip (08956) 36564
VIC20 CARTRIDGES for sale including Gorf Sargon 2 Chess £15 each Also Rat Race Starbattle Jellymonsters Alien and many many more £11 each Tel 574 4122 after 5 pm
64K RAM EXPANSION for Vic20 £90 Tel Penketh 2601
VIC20 + **CASSETTE PLAYER** 16K 3K super expander programs reference guide etc Vic revealed software and joystick, £250 Tel Ripley 810217
VIC20 C2N CASSETTE, 8K Ram, £100 of cassette software £120 cartridge software programmers reference guide Commodore Computing magazines £235 ono Tel Burton (Derbyshire) 78025
VIC20 COLOUR COMPUTER + cassette good condition including Demo cassette etc, £125 Tel Bishops Stortford 57011
VIC20 PLUS SUPER EXPANDER still under guarantee programs and software etc, £130 or nearest offer Tel 01-800 8517 after 5 pm
COMMODORE VIC20 with C2N tape unit complete dust cover etc excellent £20 joystick all manuals, Road Race plug in cartridge as well as much tape software included, original Bug-Byte Vic Ben Blitz excellent condition £200 ono Tel Padgate 810480 after 5 pm
VIC20 + **CASSETTE DECK,** Blitz Frogger and Domino all boxed swap for Dragon 32 Tel 061 941 2553
VIC20 GAMES to swap or sell games from Audiogenic, Llamasoft Hobbit and many more Tel 0442 58200
VIC20 AS NEW 8K C2N cassette recorder joystick £16 books + £60 well-known games, £200 Tel Aberystwyth 611341 after 5 pm
VIC20 + **C2N** 16K Ram £100 ono Tel Taunton 56726 anytime
VIC20 + **C2N** + 16K, over £1 000 of software 85 tapes joystick books magazines excellent condition value £1 400 yours for £450 ono Tel Ruislip (08956) 36564 (4 30 pm)
PIRATE COVE CARTRIDGE, £17 Tel N Rodgers 0742 344427 day time
BRAND NEW COMMODORE 64 list price £345 sale price £295 (a saving of £50) 10 for sale For details write to 64 Offer 3 Wensley Close Harpenden Herts AL5 1RZ
VIC20, cassette 35807 motherboard 8K Ram expansion machine code monitor manuals books on machine code + Basic joystick + over £300-worth of software including Jelly Monsters Sargon II Chess Star Battle Avenger + Alien £360 ono or swap for BBC model B T Wilson 21 Chantonfield Fulwood Preston Lancs PR2 3WH
VIC20 + cassette with 3K Super expander + 8K Mission Impossible + Radar Ratrace Vic Revealed Intro to Basic part 1 Mastermind Backgammon + other software best offer secures Tel 01 852 6367
FREE VIC20 + C2N + 16K + 3K expansion units + well over £1 000 software consisting of 95 per cent cassette based software (mainly games) two game cartridges joystick books and mags Value approx £1 400 all this for nothing provided that the introduction manual is purchased for £450 Tel Ruislip 08956 36564
SWAP VIC20 C2N cassette recorder software and programming kit all under guarantee in very good condition for your Atari 400 + cassette Rec basic cartridge and software Tel Peterborough 242811
8K COMMODORE VIC20 + Starbattle + Mission Impossible intro to basic part 1 Vic revealed loads of tapes £140 Tel 0482 823276
VIC20, boxed three months old £85 ono Tel 07072 68456
COMMODORE PET 3016 16K 12 inch screen look let chip model cassette oads manuals + dust cover software progs £225 Tel 0203 465472
VIC 8K Ram cartridge + 8K software £25 Tel Harpenden (05827) 5232 eves

Ataris for sale

ATARI VCS 4 cartridges including PacMan good condition, £66 Tel (Formby) 07048 70531
ATARI OWNER wants to sell buy or swap programs Tel Winterbourn 776072
ATARI VCS + 11 cartridges £150 Tel 0434 604272 anytime
ATARI 800, 32K cassette manuals £300 of software £350 Jim Franklin tel 01-995 4988
SWAP ATARI 8 games for 16K Spectrum Tel 01-672 4824
ATARI VCS + PacMan + Video Chess mint condition boxed as new £90 Tel 348 5568 after 6 pm
ATARI 800 16K including program recorder 2 joysticks Asteroids Basketball Star Raiders Centipede + Basic cartridges 2 books, all leads offers Tel Dave 061-427 4827
ATARI VCS + PacMan + Asteroids + Berserk + extra paddles £110 Tel 01 582 1689 (after 6 pm)
ATARI 400 48K, cassette recorder joysticks books + manuals service guarantee on hardware over £400 of cassette games software including well known arcade games superb £350 for quick sale Tel 0702 201837
ATARI VCS with paddles joysticks Invaders Asteroids Combat cartridges, almost new offers around £60 Tel Leicester 0533 868852 after 6 pm
ATARI 800 600 cassette recorder with joysticks £70 of software 4 months old almost new £399 Tel 061 387 2487
ATARI VCS + all accessories + Space Invaders + Combat cartridges £56 + many other cartridges from £8 up Tel Slough 20735 after 6 pm
ATARI 400 with 48K + Intome keyboard + basic, £200 Tel home 274 7897 work 353 6566

Acorns for sale

BBC MODEL B OS 1 2 + disc interface + disc drive cassette player + manual + leads etc also tons of software including machine code monitor with Rom only £699 — will sell disc separately Tel Uxbridge 0895 35138
BBC MODEL B + monitor + cassette recorder software books 7 months old open to offers Tel Mansfield 550372 after 6 pm
BBC B 32K 3 months old recorder joystick books magazines software £390 ono Free delivery up to 30 miles Tel Gloucester 23436 (6 pm)
ACORN ATOM 2K Ram 12K Rom floating point all leads + power supply manual software recent manufacturer service £150 Tel Southampton 736258 after 6 pm.
ACORN ATOM, 12K and 12K Ram Ross utility Rom external power supply games books cassette deck complete £130 Tel (0793) 823183

For sale

CASIO FX502P Personal Computer complete with manuals cassette interface etc £80 ono Tel 531 2692
VIC20 software to swap or sell ono Vicman Tomb of Dwin Vic Rescue Lazerzone Martian Invader Myriads Tel 031 8617477
MANSION ADVENTURES, also Startraders swap for any other adventure game Tel 707 0083

FOUR VIC20 CARTRIDGES worth £85 new sell for £50 Tel Newels 0836 708326

JUPITER ACE, brand new £60 Tel 061 4288281

ITT 20/20 (Apple) 48K — 1 disc drive £500 ono Tel 204 7032 weekday evenings

COMMODORE 64 GAMES — Star trek, Othello, Backgammon, Draits, Pontoon and Synth machine code side scroll prices range from £2.95 to £5.95 Tel 748 6179 after 5 pm or weekends any time

TRS 80 MODEL 1, level 2 4 months sha nearly £300 worth of software and cassette recorder plus soundbox books, manuals price £250. Tel 081 705 3468 after 5 pm

DO YOU WRITE MACHINE CODE? On the backs of envelopes? If so why not use our coding sheets at only 3p each or £2.50 for 100 Send cheques/POs to M A. Valentine 101A Underdale Road Monkmoor Shrewsbury Shropshire SY2 5EF

48/KOSHA GP100A PRINTER six months old excellent condition (owner has upgraded) Centronics parallel used with a Dragon 32 previously £150 (present price £240) Tel Rustington (W Sussex) 09062 72845

BORIS MULTI-LEVEL CHESS COMPUTER, mint condition with free chess set and power supply £125 ono Tel Aylesbury 27357

ORIC SOFTWARE for sale Tel 486 5869

ORIC 1 — 48K Ram plus Forth and manuals plus mags and adventure games New price £210 — asking price £170 Tel Nottingham 296074

ATARI TV GAME with five cartridges four months two Worth over £200 Sell for £100 Tel 051 9286011

VIC20 GAMES Scramble, Myeroid Tank War Arcadia Alien Wars Star Duel Sub Space Strike Incounter Space Strm etc all cash offers Tel Yateley 872310

VIC20 CARTRIDGES and cassettes for sale most at net-price. Tel 574 4122

VIC20 Chopifter Rom cartridge swap for either Commodore machine code monitor or 8K Ram pack Tel 021 486 4475

COMMODORE 64 games buy or swap or part exchange your Commodore 64 games. We sell Commodore 64 games for £2.95 — £6.95 We have two brand new games No 1 Robot Craze No 2 3D Starship Entry each for £8.95 Tel 01-450 4858

SWAP DRAGON 32, Alcatraz 2 for Donkey King cassette Tel 061 7962036

TEXAS TI994A with cassette lead Parsec Rom cartridge 2 cassettes in original packaging with guarantee £115 ono Tel Sheffield (0742) 341722

SHARP MZ80K, six languages word processor 100 program library £380 Tel Tewkesbury 297579

VIC20 PRINTER + Vicwriter cartridge £180 Tel Northwich 2160

PIRATE S COVE cartridge for Vic20 — swap for other adventure cartridges Tel 01-952 4748 after 4 30 pm

£150 WORTH of Vic software in Rugbyte Impact, Interceptor and Llamasoft Will accept £100 or sell separately Tel 021 7043815

EXCHANGE YOUR SOFTWARE with me Send sae to M A. Valentine 101A Underdale Road Monkmoor Shrewsbury Shropshire SY2 5EF

TANDY mini-disc drives, three available £195 each or £500 for all three Tel 0630 83733

SWAP BINATONE HI-FI for a 16K or 48K Spectrum Tel 061 740 9861

JACKPOT FRUIT MACHINE, for unexpanded Vic20 four reels hold, sound + large graphics just £3.99 Phil Macdonald 43 Freshwater Drive Hamworthy Poole, Dorset.

INTELLIVISION 11 cartridges, sell £150 or exchange 48K Spectrum Dragon Tel 01 348 8486

DRAGON 32 games cartridges, Meteoroids Berzerk and American Football As new cost £20 each will accept £15 each Tel 01-876 6836 (Richmond)

BOOK BYTEING DEEPER into YOUR ZX81 including 37 programmes for unexpanded ZX81 As new condition cost £4.95 new will accept £2.60 including postage Tel Gadebrook (0823) 86462

GREAT COMMODORE 64 ARCADE + educational games Prices from £2.49-£8.95 Tel 01-450 4858

SWAP ATARI 800 + 410 program recorder joysticks manuals including De-re Atari programmers etc 5 months old for similarly equipped BBC computer Tel Eastbourne 841719

ITT 20/20 (APPLE) 48K Ram £300 Tel 01-451 0520

TI LCD PROGRAMMER CALCULATOR few hours use only £32 Tel 01-451 0520

SHARP MZ 80K, 48K Ram 8 months guarantee left, re-set button excellent condition £275 ono Tel 802 3039

ABS COMPUTER INSURANCE PROGRAM central processor with 64K byte (32K words of memory) 10 6 mega-byte disc-drive high-speed band printer 240 lines per minute 3 VDUs offers Tel Slough 25496

FOR SALE 48K UPGRADE for issue one Spectrum £25 Tel 061 225 8064

SWAP VIC20 + cassette unit + 16K Ram + over £90 of books and software for an Atari 400 + cassette unit + basic cartridge + software Tel Guilane 682613

AVENGER CARTRIDGE for Vic20 £8 50 Tel Stevenage 811634 after 7 pm

SWAP JUPITER LANDER + Adventureland for any Audiogenic cartridges Tel Pipegate 297

TI 99 4A with mini-memory line by assembler extended basics joysticks Grammar for Beginners + tape cable £240 Tel 01-515 7982

MENTOR Z80 DEVELOPMENT SYSTEM including power supply £65 Tel 061-428 7312 anytime

CASSETTE OF UNEXPANDED VIC20 15 games on it including Blitz £5 50 Tel 207 0926

VIC20 SOFTWARE, cartridges + cassettes, most half price including Gorf Jelly Monsters Star Battle + Lazerzone Tel 574 4122

Cruising/Blind Alley

Cruising

The highest score sent in so far this month is 9968 from Carl Doran of Skidby Mill N Humberside Entries for this month's competition close on May 31

Blind Alley

The highest score sent is so far is 32465 from Jonathan Farmer of 34 Cramond Park Edinburgh Entries for this month s competition close on May 31

SPECTRUM SOFTWARE all top games on one cassette for £10 Games include Football Manager Cyber Rats Maze-man Battle of Bruin 3D Tunnel Avenger and many more for only £10 Tel 0555 71076

MANY ARCADE GAMES £3 50 for each one or £25 the lot 8 games altogether Tel Wilmslow 522375

JUPITER ACE, two months use 3K Ram + Introduction to Forth + seven extra programs £70 Tel Woking 66678

SWAP SPECTRUM GAMES for others Tel 0822 61917 after 4 pm ask for Ian

INTELLIVISION with nine Rom cartridges for £180 ono Tel 01-310 8102 after 5 pm

SHARP PC 1211 with manuals, cassette unit + two games tapes £40 Tel Mr Rodgers 0742 34427 daytime

UK 101 8K, cased £80 ono Tel 01 587 1660 Ask for Len after 6 pm

Wanted

WANTED DRAGON COPY-KAT TAPE exchange anything from my large and varied collection of cassette software Details Staines 58707 after 6 pm

WANTED, ONE COPY of the first issue of *Dragon User* can anyone sell me one? Send to Hugh Barr Seagull Cottage Waterloo Breach Isle of Skye or tel (04712) 437

WANTED MZ 80K, cash for reasonable offer Tel (Nelson Lancs) 0282 68715

7-SLOT ARFON BOARD with rack for Vic20 in exchange for Stack 4 slot mother board + cash Tel Lichfield 53344

WANTED, ANY BACK ISSUES of computing magazines preferably for Spectrum Tel Rhymney 0685 881581

WANTED ZX SPECTRUM 48K + printer cash paid Tel 09285 63052

WANTED GRID RUNNER for unexpanded Vic Tel Banbury 720640

WANTED, 16K RAM for ZX81 £10 Tel 0249 812038

WANTED 16K RAM for Vic20 Tel 01 205 9849 (after 6 pm)

WANTED ZX printer for under £20 (condition not important) Tel Ray 579 0065

WANTED Atari cassette unit + software especially Defender + Miner 2049er Tel Ascot 21180

DRAGON 32s REQUIRED, £130 for each sound machine immediate decision I will arrange collection/despatch Details to A. Ellis 22 Tumarean Road St Austell Cornwall PL25 5NX

WANTED Vic20 with extras, £150 available Tel Brenchley 3885 (home) or 01 211 5127 (work)

WANTED to buy or exchange BBC Model A or B Dunstable (0582) 68629

SPECTRUM, 48K wanted also software if available fair price paid for example in excellent condition Tel 01-697 8274 evenings

PARKER Star Wars cartridge for Atari VCS in exchange for Demon Attack. Tel 04882 70316

WANTED BBC B software to swap Tel 0256 71 2754

LYNX, brand new must be sell under guarantee £170 — £300 Tel 04 882 70316

WANTED ZX Printer Tel 0622 61617 after 4 pm.

WANTED any Acetronic cartridges price depends on age and condition Tel Bourne End Bucks 23797

WANTED — Zaxxon game for the Atari 400 Will swap for another game or will pay cash Tel 01-989 8134 evenings and weekends

ZX80s wanted £10 Tel 0904 769926

PRACTICAL USES



Author Adrian Dickens

It seems almost impossible to believe that there could be room for another book on the Spectrum However Melbourne House obviously think they have found a gap and have just issued the *Spectrum Hardware Manual* by Adrian Dickens

This 112 page book is intended for those who like to find practical uses for their micros. It includes instructions for building joysticks and connecting a full-sized keyboard

The author of the book is not one of the well-known computer names who seem to produce dozens of books a year He is a 21-year-old engineering student at Churchill College Cambridge

The book includes full circuit diagrams and discusses the workings of each component

Book	*Spectrum Hardware Manual*
Price	*£5 95*
Micro	*Spectrum*
Supplier	*Melbourne House* *Glebe College* *Station Road* *Cheddington* *Leighton Buzzard* *Bedfordshire*

BEETLE CHASE!

AWA software is a new name in games software One of its first releases is a maze game for the Spectrum

In a vaguely *Pacman*-like scenario you are chased around a maze by beetles whose eggs you are trying to steal (serves you right I would say) If you survive there are more difficult mazes to follow

Program	*Beetlemania*
Price	*£5 50*
Micro	*Spectrum 16/48K*
Supplier	*AWA Software* *50 Dundonald Road* *Didsbury* *Manchester M20 0RU*

MAZE HUNT!

Personal Software Services is one of those software houses still offering new programs for the ZX81

Ghost Hunt requires you to gobble your way through a maze chased by ghosts and defending yourself with power pills No prizes at all for guessing the arcade game on which it is based

The game requires 16K and is written totally in machine code

Program	*Ghost Hunt*
Price	*£3 95*
Micro	*ZX81 16K*
Supplier	*Personal Software Services* *452 Stoney Stanton Road* *Coventry CV6 5DG*

PLANE CRASH

While the ZX81 is well suited to the limited requirements of text adventures it would not be anybody's first choice for an adventure featuring graphics

Nevertheless Computer Rentals has issued precisely that — a graphic adventure for the 16K ZX81

Called *Escape from Manhattan* it sounds very much like the scenario for the film *Escape from New York* — the President's plane has crashed in Manhattan which is not a prison complex and you have to rescue him

The game is written by Nigel Taylor whose youth — he is 13 — is becoming the norm these days

Program	*Escape from Manhattan*
Price	*£3 50*
Micro	*ZX81 16K*
Supplier	*Computer Rentals* *140 Whitechapel Road* *London E1*

GIANT CRABS!

Mysterious Island is a graphic adventure for the 16K Vic which actually involves 30K of program

The game is split into two halves — you only *Load* part 2 once a secret codeword has been discovered from part 1

The game features various nasties like giant bees and crabs For those who complete the game there is the promise of a "personalised award" from the manufacturers

Program	*Mysterious Island*
Price	*£9 90*
Micro	*Vic 20 16K*
Supplier	*Mr Micro* *69 Partington Lane* *Swinton* *Manchester M27 3AL*

GLOBAL INFO

Information on the entire world, including every sovereign state language regime and military alliance, is offered by *World Info* from Wimsoft

This program is designed for those who need background facts to prepare news stories, articles essays etc

In order to use this program you will also need Cambell Systems *Masterfile* into which *World Info* is loaded as a datafile

Program	*World Info*
Prier	*£5 00*
Micro	*Spectrum 16/48K (16K is reduced version)*
Supplier	*Wimsoft* *20 Brookside Road* *Wimborne Minster* *Dorset BH21 2BL*

MOVING ON

Windrush Micro Systems is a company that has previously specialised in the upper ranges of the 6809 market

It has now moved into the Dragon market with *Dragon Mace* a cartridge which is an "Editor/Assembler/Monitor" package

The cartridge comes complete with an 80-page explanatory booklet It is intended for those who are proficient at Basic and who wish to move on to assembly language

Program	*Mace*
Price	*£29 95*
Micro	*Dragon 32*
Supplier	*Windrush Micro Systems* *Worstead Laboratories* *North Walsham* *Norfolk NR28 9SA*

A CLEAR PATH

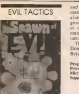
New Generation Software has something of a cult following amongst Spectrum owners There will be much interest therefore in its latest release

The game is called *Knot in 3D* — a dreadful pun since the game most obviously is in 3D and this fact is crucial to playing the game

You rush through empty space, leaving a green/yellow trail while you are pursued by up to four chasers which leave red/blue trails Since the space is enclosed the trails become increasingly *Knotted* and it becomes even more difficult to find a clear path

Program	*Knot in 3D*
Price	*£5 95*
Micro	*Spectrum 48K*
Supplier	*New Generation Software* *Freepost BS3433* *Oldland Common* *Bristol BS15 6BR*

EVIL TACTICS



DK' Tronics was, until recently, best known for its range of hardware for the Spectrum and ZX81 However in recent months it has released a growing range of software

One of the most recent releases is *Spawn of Evil* Although this game features both lasers and aliens it is unlike traditional "shoot em up" games The instructions alone take up one side of the cassette

Your objective is to destroy the "spawn" before they have a chance to complete their complex breeding cycle and evolve into their most vicious form

Doing well in the game is partly a matter of firing lasers and the like but it is also a matter of seeking out the aliens at their breeding grounds and destroying them at the most opportune moment — a matter of some tactical thought

The program was written by Don Priestly author of Bug-Byte's *Mazogs* for the ZX81

Program *Spawn of Evil*
Price *£4 95*
Micro *Spectrum 16/48K*
Supplier *DK Tronics Unit 2*
Shire Hill Industrial
Estate
Saffron Walden
Essex

UNUSUAL EXTRAS

The Black Hole is the first release for a new company Quest Microsoftware, which has just entered the highly competitive Spectrum software market

Although basically a spaceship against aliens game, it does offer a number of unusual extras — you have to avoid not only the aliens but also a black hole which affects the behaviour of your various weapons of destruction

The game, which has been developed by ex-defence industry programmers is claimed to be very addictive and as an added incentive cash prizes are being offered for the highest scores

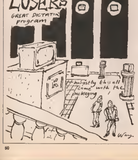
Program *The Black Hole*
Price *£5 00*
Micro *Spectrum 16/48K*
Supplier *Quest Microsoftware*
119 The Promenade
Cheltenham
Gloucestershire
GL50 1NW

MONEY-BAGS!

Mysterious Mansion is claimed to be an adventure game with a difference The difference being that a joystick is used to move yourself around the various locations

Your objective is to search for 10 bags of money which are hidden around the mansion — danger lurks in the form of several killer ghosts which you must avoid

Program *Mysterious Mansion*
Price *£5 00*
Micro *Vic20 + 3K*
Supplier *C P White (Services)*
52 Northfield Avenue
West Ealing
London
W13 9SY



BOWLED OUT!

A Dragontree Program

Coppice Software is a Lincolnshire based software company which has branched out from the Apple to the Dragon 32 in supplying software

The first release in the Dragontree collection is *Bowling* a computer simulation of the popular tenpin bowling alleys

The game features the same rules as the original with "spares" and "strikes" as well as a choice of bowling ball

Program *Bowling*
Price *£4 95*
Micro *Dragon 32*
Supplier *Coppice Systems*
7 March Street
Kirton Lindsey
Gainsborough
Lincolnshire DN21 4PH

BASIC MATHS

Cottage Software specialises in educational software for the BBC The firm has just issued a range of five cassettes which aim to teach basic mathematical skills to children

The first of these — *MUL-TABS* — features a multiplication table learning program followed by a test Incentives to do well are in the form of congratulatory messages and graphics displays

The other packages offer anything from castles to rabbits to bananas as counting aids for the child

Program *MUL-TABS*
Price *£7 50*
Micro *BBC A B*
Supplier *Cottage Software*
Heather Cottage
Selly Hill
Whitby
North Yorkshire

FLIGHT PATH

Nightflight from Salamander is one of the first Flight Simulation programs for the Dragon 32

You are in command of a single-engined light aircraft Once you have managed to take off you can manipulate the controls to perform various sophisticated aerial manoeuvres like banks and rolls

The ultimate challenge is to land the plane successfully using only the landing lights for guidance

Program *Nightflight*
Price *£7 95*
Micro *Dragon 32*
Supplier *Salamander Software*
17 Norfolk Road
Brighton
East Sussex BN1 4AA

New Releases is designed to tell people know what software is coming on to the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly 19 Whitcomb Street London WC2 7HF

Ziggurat

Brave new world

"The unleashed power of the atom has changed everything save our modes of thinking and thus we drift toward unparalleled catastrophes" thought Albert Einstein I am not a member of CND nor a supporter but I do think that Einstein's pessimistic views are only too apposite

I am not a unilateralist, but I do believe in a certain human dignity a human dignity which seems to have become easily submerged in computing

Recently I read a letter which complained about an advertisement from a group of peace programmers the author of the letter said that if he saw such an advertisement again he would not read this magazine again — politics should play no part in computing Apart from the fact that to be in favour of peace does not need to be party political — all are in favour of peace — to try to pretend that computing (and information technology) are of no political significance is to be simple-minded

We cannot disguise from ourselves (or can we?) that computing occurs in the world is a highly important aspect of that world and is going to become more important I suppose that for those who do not wish to see there is no relation whatsoever the Japanese project to produce fifth generation computers and the reluctance of both the UK and the USA to join them is not at all political But as I said earlier my interest is not really in people who fool themselves into thinking that politics and computing are unrelated I wonder what effect computing has had and is having upon our dignity as humans

Some of you may have seen the extremely worrying *Horizon* programme recently about Artificial Intelligence and the promoters of AI in academia and elsewhere I was very worried by the attitudes of these supporters and I was left with the distinctly unpleasant feeling that a fair proportion of them were more in love with their machines than they were with humanity To hear one highly influential professor the future with computers would approach perfection because the computers would provide answers to all our problems

The machines would not allow us to be so silly as we have been in the past.

If for *machines* we substituted *master race* it would sound rather silly even rather extremist perhaps deluded Perhaps they are not the only ones who are deluded into forgetting common humanity

During the Falklands conflict there appeared several repulsive programs I seem to remember ones with the inspiring titles *Argie-Bargie* or *Bomb Buenos Aires* titles which were an insult to common humanity There can be no comparison between that rather good little game (often copied) *Bomber* or *Blitz* which is not a concentrated expression of spleen aimed to cash in on a cheap sensation What self-respect can we have if we purchase games in such bad taste?

War Plan Alpha 5 This is not a drill You must fly through the stiff Russian defences — Mig fighters and surface-to-air missiles — to the target city bomb it and return home From *B-1 Nuclear Bomber*, £11 95 on cassette by Avalon Hill for Atari

Each year you must decide to allocate some resources into massive espionage efforts to locate enemy bases and industrial centres or concentrate effort into producing more engines of nuclear destruction Victory is determined by population remaining and world political opinion From *Nukewar* £11 95 on cassette by Avalon Hill for Atari

Whereas I have enjoyed playing many warlike games (eg chess battleships noughts and crosses), I feel there must be something wrong about the glorification of destruction embodied in some (highly over priced) games Compared to these games even *Space Invaders* seem cuddly

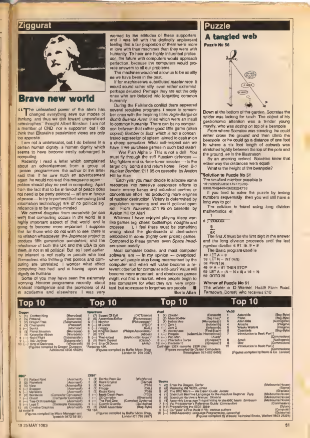
Most computer books, and most computer software are — in my opinion — overpriced when will people stop being mesmerised by the computer and when will *value* become a relevant criterion for computer add-ons? Value will become more important and obnoxious games might not find a market, when people begin to see computers for what they are very important but no excuse to forget we are people ■

Boris Allan

Puzzle

A tangled web

Puzzle No 56



Down at the bottom of the garden Socrates the spider was looking for lunch The object of his gastronomic attention was a tender young mayfly, who was dozing on top of a beanpole

From where Socrates was standing he could either cross the ground and then climb the beanpole or he could go a distance of one foot to where a six foot length of cobweb was stretched tightly between the top of the pole and the ground as in the illustration

By an unerring instinct Socrates knew that either way the distances were equal

What is the height of the beanpole?

Solution to Puzzle No 51

The smallest number possible is 10112359550561797752808988764044943820224719

If you tried to solve the puzzle by testing numbers sequentially then you will still have a long way to go!

The solution is found using long division mathematics ie

```
   1
9 ) 9XXXXX
    9
    -
    0X
```

The first *X* must be the first digit in the answer and the long division proceeds until the last number divided is 81 ie 9 • 9

The Basic program used is

```
10 LET A = 9
20 LET N = INT (A/9)
30 PRINT N
40 IF A = 81 THEN STOP
50 LET A = (A - N • 9) • 10 + N
60 GOTO 20
```

Winner of Puzzle No 51

The winner is D Warner Heath Farm Road Ferndown Dorset who receives £10

Top 10

Dragon

1	(1)	Donkey King	(Microdeal)
2	(5)	Pimania	(Automata)
3	(2)	Dragon Trek	(Salamander)
4	(3)	Champions	(Peaksoft)
5	(—)	Sorika	(Morrison)
6	(8)	Planet Invasion	(Microdeal)
7	(4)	Katerpillar Attack	(Microdeal)
8	(—)	Night Flight	(Salamander)
9	(—)	Star Jammer	(Salamander)
10	(—)	King of Darkness	(Wintersoft)

(Figures compiled by Dragon Dungeon Ashbourne 0335 44626)

Top 10

Spectrum

1	(7)	Spawn Of Evil	(DK'Tronics)
2	(8)	Assembler/Editor	(Picturesque)
3	(—)	Monitor	(Picturesque)*
4	(—)	M Coder	(PSS)*
5	(—)	Froggy	(DJL)
6	(4)	Knights Quest	(Phipps Associates)*
7	(8)	ETX	(Abbex)
8	(—)	The Hobbit	(Melbourne House)*
9	(8)	Basic Crystal	(Carnel)
10	(—)	Ship Of Doom	(Artic)

*Requires 48K

(Figures compiled by Buffer Micro Shop London 01 769 2887)

Top 10

Atari

1	(4)	Zaxxon	(Datasoft)
2	(2)	Miner2049er	(Big Five)*
3	(1)	Hellcat Ace	(Microprose)†
4	(—)	Zork 1	(Infocom)‡
5	(—)	Zork 3	(Infocom)‡
6	(5)	Astrochase	(First Star)†
7	(—)	Preppie	(Adventure International)
8	(—)	Pac-Man	(Atari)*
9	(—)	Pharaoh's Curse	(Synapse)†
10	(—)	Protector 2	(Synapse)†

Cartridge †32K cassette ‡32K disc

(Figures compiled by Calisto Computers Birmingham 021-632 6458)

Top 10

Vic20

1	Asteroids	(Bug-Byte)
2	Panic	(Bug-Byte)
3	Alien Blitz	(Audiogenic)
4	Arcadia	(Imagine)
5	Wacky Waiters	(Imagine)
6	Cosmiads	(Bug-Byte)
7	Introduction to Basic Part 1	(Commodore)
8	Amok	(Audiogenic)
9	Blitz	(Commodore)
10	Introduction to Basic Part 2	(Commodore)

(Figures compiled by Boots & Co London)

BBC*

1	(1)	Rocket Raid	(Acornsoft)
2	(3)	Planetoid	(Acornsoft)
3	(5)	View	(Acornsoft)†
4	(—)	Snapper	(Acornsoft)
5	(—)	Monsters	(Acornsoft)
6	(4)	Wordwise	(Computer Concepts)†
7	(—)	Quest	(Computer Concepts)
8	(—)	Tree Of Knowledge	(Acornsoft)
9	(—)	Logo 2	(Computer Concepts)
10	(6)	Creative Graphics	(Acornsoft)

*All model B

(Figures compiled by Micro Management Ipswich 0473 58181)

ZX81*

1	(4)	Do Not Pass Go	(Workforce)
2	(6)	Basic Crystal	(Carnel)
3	(8)	M Coder	(PSS)
4	(1)	Froggy	(DJL)
5	(3)	Krazy Kong	(PSS)
6	(—)	Mazis Death Rock	(PSS)
7	(—)	ZX Compiler	(Silversoft)
8	(—)	The Fast One	(Campbell Systems)
9	(—)	Cosmic Guerilla	(Quicksilva)
10	(3)	ZXAS Assembler	(Bug-Byte)

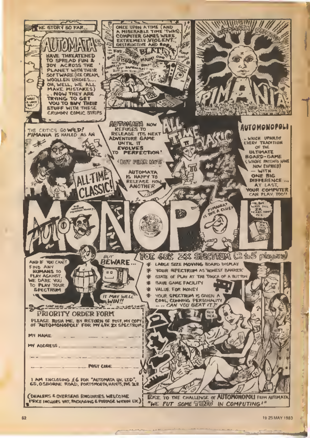
*All 16K

(Figures compiled by Buffer Micro Shop London 01 769 2887)

Books

1	(2)	Enter the Dragon, *Carter*	(Melbourne House)
2	(3)	Mastering the Vic20, *Jones*	(Sigma)
3	(6)	The BBC Micro — An Expert Guide *James*	(Granada)
4	(1)	Spectrum Machine Language for the Absolute Beginner *Tyne*	(Melbourne House)
5	(9)	Spectrum Hardware Manual *Dickens*	(Melbourne House)
6	(4)	Assembly Language Programming for the BBC Micro *Birnbaum*	(Melbourne House)
7	(—)	Vic Programmer's Reference Guide *Commodore*	(Commodore)
8	(10)	Programming the 6502 *Zaks*	(Sybex)
9	(—)	Compute!'s First Book of Vic *various authors*	(Compute!)
10	(—)	6809 Assembly Language Programming, *Leventhal*	(Osborne)

(Figures compiled by Watford Technical Books, Watford 0923 26324)



THE STORY SO FAR..
AUTOMATA UK LTD
HAVE THREATENED TO SPREAD FUN & JOY ACROSS THE PLANET WITH THEIR SOFTWARE (ICE CREAM, WOOLLEN UNDIES.... OH, WELL, WE ALL MAKE MISTAKES) .. NOW THEY ARE TRYING TO GET YOU TO BUY THEIR STUFF WITH THESE CRUMMY COMIC STRIPS
ONCE UPON A TIME (AND A MISERABLE TIME 'TWAS) COMPUTER GAMES WERE EXTREMELY VIOLENT, DESTRUCTIVE AND BORING
BLAT!
MAIM!
THEN AUTOMATA CREATED
PIMANIA
THE CRITICS GO WILD! PIMANIA IS HAILED AS AN
ALL-TIME CLASSIC!
AUTOMATA NOW REFUSES TO RELEASE ITS NEXT ADVENTURE GAME UNTIL IT EVOLVES TO PERFECTION'
'BUT FEAR NOT!'
AUTOMATA IS HAPPY TO RELEASE NOW ANOTHER
ALL TIME CLASSIC
AUTOMONOPOLI
.. WHICH UPHOLDS EVERY TRADITION OF THE ULTIMATE BOARD-GAME (WHOSE PATENTS HAVE NOW EXPIRED) — WITH ONE BIG DIFFERENCE ... AT LAST, YOUR COMPUTER CAN PLAY, TOO!"
AUTOMONOPOLI
PIMANIA? IS THIS A CLUE?
AND IF YOU CAN'T FIND ANY HUMANS TO PLAY AGAINST, WE DARE YOU TO PLAY YOUR SPECTRUM
BUT BEWARE...
IT MAY WELL WIN!!
FOR 48K ZX SPECTRUM (2 to 5 players)
✱ LARGE SIZE MOVING BOARD DISPLAY
✱ YOUR SPECTRUM AS 'HONEST BANKER'
✱ STATE OF PLAY AT THE TOUCH OF A BUTTON
✱ SAVE GAME FACILITY
✱ VALUE FOR MONEY
✱ YOUR SPECTRUM IS GIVEN A COOL, CUNNING PERSONALITY ..... CAN YOU BEAT IT?!
SNIP HERE
SNIP, SNIP!
PRIORITY ORDER FORM
PLEASE RUSH ME, BY RETURN OF POST, MY COPY OF 'AUTOMONOPOLI' FOR MY 48K ZX SPECTRUM.
MY NAME
MY ADDRESS
POST CODE
I AM ENCLOSING £6 FOR "AUTOMATA UK LTD", 65, OSBORNE ROAD, PORTSMOUTH, HANTS, PO5 3LR
(DEALERS & OVERSEAS ENQUIRIES WELCOME PRICE INCLUDES VAT, PACKAGING & POSTAGE WITHIN UK)
HEH HEH
RISE TO THE CHALLENGE OF AUTOMONOPOLI FROM AUTOMATA
"WE PUT SOME TING IN COMPUTING!"